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AUTHOR	Cummings, C. Peter; Cook, Desmond L.
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ABSTRACT

This module is the second in a self-instructional program designed to train public school personnel in how to manage educational projects. The purpose of this module is to provide current or potential project directors with the basic knowledge, skills, abilities, and sensitivities needed to manage a local educational project. In the areas of planning, the module explains how to define a project, develop a work flow plan and a schedule, and estimate needed resources and their costs. It then discusses the preparation phase, including how to initiate a project, organize it, and create a project information system. (A condensed demonstration version of lessons on the preparation phase is also part of this self-instructional program.) The module then explains the components of controlling a project, including developing a reporting system, identifying problems and their causes, solving problems through decision-making, and implementing these decisions. The module also discusses terminating a project. A lengthy case simulation section provides an opportunity for synthesis of knowledge and skills by simulating many of the decisions a project manager must make. Although the module is designed for use with a slide and tape presentation, it may be used alone. (Author/JM)

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EDUCATIONAL
PROJECT
MANAGEMENT
INSTRUCTIONAL
SYSTEM

EPMIS

ED181545

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Volume I - Lessons 1 to 6

C. PETER CUMMINGS & DESMOND L. COOK

Administering for Change Program
Philadelphia, Pennsylvania 19103

and

Educational Program Management Center
The Ohio State University

May 1973

EA 012 328

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THESE MATERIALS DEVELOPED BY

C. Peter Cummings
and
Desmond L. Cook

Assisted By

Steven Gyuro
Rodney J. Ball

PROJECT MANAGEMENT COMPONENT
C. Peter Cummings, Director

ADMINISTERING FOR CHANGE PROGRAM
Sanford Temkin, Director
Mary V. Brown, Deputy Director

RESEARCH FOR BETTER SCHOOLS, INC.
Robert G. Scanlon, Executive Director

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MODULE MANUAL

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Module Manual

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

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A. MODULE MANUAL INSTRUCTIONS

The module manual contains two major sections--Module Description and Module Directions and Forms. The Module Description section specifies the goals, describes the elements, indicates the materials needed, describes the student flow and gives suggestions on group use.

The Module Directions and Forms section contains the directions and/or the forms for working through the module. It is the instructional part of the module where the work is to take place.

It is essential to read the Module Description section to fully understand the module before starting to work through it.

Directions: If you are working through the module alone, start by reading the next section.

If you are completing the module with a group, wait for directions from the group leader.

B. PREFACE

American education in the past decade has been characterized by the increasing educational effort of the federal government. Concurrent with the federal activity in public education there have been groups of educators who were aware of difficulties within their area of specialty and created programs to improve public education. An example is the School Mathematics Study Group (SMSG), a project funded by the National Science Foundation, which worked on the improvement of the whole mathematics curriculum for the purpose of improving the mathematics knowledge for the widest possible group of students.

Many other groups of professionals in education have been aware of the wide gap between what is and what could be achieved in education in our public schools. The stated concerns of these groups of educators have found their way to foundations and to concerned public officials in the state and federal government. Goal setting at the federal level and the work done by education groups at other levels has resulted in federal legislation to provide the funds to work toward the solution of the recognized educational problems. As a result, project proposals, experimentation, and curriculum revision groups have been founded.

There is a need for elements of management discipline in the local schools. Because public funds are involved and accountability is necessary in dealing with public funds, the problem of designing, administering and evaluating a federal, state, or locally funded project becomes a concern at all educational levels. In this regard, the role of educational project manager needs to be defined and a group of people need to become experienced in this role. Because of the increasing number of projects in education, the expanding nature of projects now in existence, and rising cost of the total effort, competent educational project managers need to be recruited and trained in the role.

The need for a more comprehensive approach to planning and controlling projects in the educational environment is established by the observation that this type of activity in education is: (a) becoming both more complex and larger, (b) calling for greater allocations of money, and (c) continuing for longer periods of time. The concept of project management as a discipline is just making its debut in the educational environment.

In order to help meet the emerging need for public school personnel trained in project management, Research for Better Schools, Inc., of Philadelphia, Pennsylvania has developed self-instructional materials in the area of educational project management called the Educational Project Management Instructional System (EPMIS).

The seven modules and supplementary materials of EPMIS are described below:

a. Executive Orientation. This module is designed to introduce top-level administration to the concepts of project, management, and project management. Topics such as the advantages and limitations of project management and the requirements and organization of a project management system in a local education agency (LEA) are emphasized.

b. Basic Principles and Techniques of Project Management. This module is designed for acting or potential project directors in a local school district and covers the four major phases of project management: project planning, implementation, monitoring and control, and termination.

c. Proposal Development. This module is designed to assist local school district personnel in the development of project proposals and covers such topics as translating an idea into a proposal, proposal formats, and application procedures for funding and contractual arrangements.

d. Organizing a Project Management System. This module is designed to assist local school district personnel in analyzing their current project status through a specially developed questionnaire and developing an organizational structure and procedures handbook for implementing a project management system.

e. Developing a Project Management Inservice Training Program. This module is designed to assist local school district personnel in developing and maintaining an inservice training program for project support personnel.

f. Developing a Project Management Self-Evaluation System. This module is designed to help local school district personnel in developing and maintaining an evaluation program to assess the effectiveness of their project management system.

g. Contingency Analysis and Planning. This module is designed to assist local school district personnel in the analysis of project plans with the purpose of anticipating and dealing with potential problems and deviations from a plan.

h. Supplementary Materials.

  (1). Case simulation on project management designed for use either independently or in conjunction with the Basic Principles and Techniques of Project Management module.

  (2). Films relating to project management.

(3). Mini-packages on topics of special interest.

If you desire more information regarding these materials, write to:

Research for Better Schools, Inc.
Suite 1700
1700 Market Street
Philadelphia, Pennsylvania 19103

C. MODULE DESCRIPTION

1. Module Goals

The purpose of this instructional module is to provide current or potential project directors with the basic knowledge, skills, abilities and sensitivities needed to manage a project in the local educational setting. The module provides instruction in the project management areas of planning, preparation, control, and termination. The goals of the module are listed below.

In planning, the student should be able to do the following:

Define a project and create a work breakdown structure.

Develop a work flow.

Estimate time for work activities and develop a schedule.

Estimate resources needed.

Estimate cost and develop a budget and expenditure plan.

In preparation, the student should be able to do the following:

Start-up a project.

Organize a project.

Create a management information system.

In control, the student should be able to do the following:

Develop a reporting system.

Identify problems and their causes.

Solve problems through decision making.

Implement the decisions made.

In termination, the student should be able to do the following:

Terminate a project.

The specific objectives derived from the above goals are identified for each lesson in the module and are included in the introductory section of the lessons.

2. Module Elements

Module 2--Basic Principles and Techniques of Project Management consists of twelve self-instructional, individualized and audio-visually presented lessons, management instructions and evaluation instruments. Each lesson in the module contains an introduction, the lesson presentation, exercises, exercise solutions, management instructions, additional examples, reading references and evaluation instruments. The lessons are grouped into four phases according to the lifespan of a project. A description of the content presentation of each lesson follows in abstract form.

Introduction

Lesson 1--Introduction to Project Management

An orientation to the module is provided by identifying the lessons connected with the four phases of the life cycle of a project. The components constituting the lessons are described and the term "project" is defined and described in some detail. Project management is explained and the functions of management are described. The role and some of the duties of a project manager are identified.

Project Planning Phase

Lesson 2--Project Definition

Project definition is the activity concerned with describing a project. This activity involves specifying a project boundary and identifying those features of an educational problem area of concern which are to be dealt with by the project. The description includes all the statements of objectives which are intrinsic to the activity being developed and explains the broad to specific nature of the various statements.

Lesson 3--Developing a Work Flow

The concept of work flow is defined and its relationship to the overall project planning phase established: Basic principles of construction and commonly used symbols are represented. Emphasis is given to the use of event-oriented and activity-oriented network diagrams or charts as a means of showing the sequence and logical order in which project tasks identified in the work breakdown structure or project definition step must be accomplished. The importance of the graphical representation as a logical tool, a communication device, and a means of project control are cited.

Lesson 4--Time Estimation

Time estimation is an attempt to determine the length of time needed by a skilled person to accomplish the task assuming availability of equipment and resources. The time estimation is the amount of time it takes to complete the tasks, especially the longest time path of the work flow, called the critical path. Time estimation utilizes units of time (e.g., weeks, days, etc.) and includes the most likely, pessimistic, and optimistic times needed to complete the project.

Lesson 5--Resource Estimation and Scheduling

Resource estimation is the process of determining the various types or categories of resources needed to accomplish the various tasks or activities in the project. Resources are generally of four types--personnel, equipment and materials, services, and travel. Effective project management requires that the resources be allocated in such a manner to provide for a smooth flow of work. The use of modified bar charts provides a convenient way of not only determining resource needs for a particular task but also provides a means for efficient allocation. The process of project scheduling is highly related to the careful determination of resource needs and their proper allocation among the tasks during the course of the project.

Lesson 6--Cost Estimates and Budgets

Cost estimation is the determination of the amount of money needed for a work unit and for the total project. The budget is the plan for expending project resources. Budgeting involves the determination of both direct and indirect costs. Typical budget categories are personnel salaries, wages, and benefits; equipment, materials and supplies, travel, contracted servies, and indirect costs. The resource commonality table or "shopping list" is the basic document used in estimating costs and budgeting.

Project Preparation Phase

Lesson 7--Project Start-Up

Project start-up focuses upon the activities involved in preparing to put a project into operation. A project start-up plan should be developed. It should cover proposal and contract review, project manager appointment, personnel recruitment, equipment and material acquisition, space and facilities acquisition, and project handbook development. Careful planning and preparation at this stage can prevent many problems and delays in project operations.

Lesson 8--Project Information System

Developing a project information system is an early activity in managing a project. This information system includes a project data base, organizational charts and documents, and a procedures handbook.

Work sheets of schedule, cost, and performance are inputs to the data base as well as information from the proposal plan document and the negotiated contract. Task assignments, responsibility appointments, and updated progress of work are inputs to the information system; reports to other organizations are outputs of the information system.

Project Operational Control Phase

Lesson 9--Project Operations--Monitoring and Control

Problem identification through management reports is the first step in the three-step, problem-solving process called control. Problem identification is dependent upon a reporting system which provides information on the past, present, and projected status of the project work effort. Deviations between the planned situation and the actual situation represent management problems. Deviations are discovered by making time, cost, and performance measurements and specified points in the life of a project.

Lesson 10--Problem-Solving Through Management Action

The solution of a problem which occurs during the operation of a project involves the determination of the cause of the problem, the generation of alternative solutions, and the selection of a "best" solution. The selection of a "best" solution is facilitated by the analysis of each alternative on the basis of project "needs" and "likes". The analysis of an alternative involves a go/no go evaluation for each "need" and the assignment of a weight for each "like."

Lesson 11--Implementing Changes in Project Operations

After selecting action to be taken to solve a problem, it is necessary to implement it. Such action must plan for consequences, and include controls, reporting procedures, and detailed staff instructions. Information must be provided to management about the changes made. The decision must be monitored to be sure it is working smoothly.

Project Termination Phase

Lesson 12--Project Termination

When nearing the end of a project the project manager initiates the activities of closing out the project. A plan for these termination activities is required and includes the project final report, the project history report, disposition of facilities, equipment and supplies, location and reassignment of personnel, sorting and disposition of project records, and final financial accounting.

3. Module Materials

Materials Needed

The materials that are needed for this module are the following items:

a. Module Manual

b. Twelve (12) lesson booklets for each individual, one booklet for each lesson

c. Twelve (12) sets of color slides, one set for each lesson

d. Twelve (12) audio cassette tapes, one tape for each lesson

Equipment Needed

Since project management concepts are presented in an audio-visual format you will need the following equipment in order to complete the lessons.

a. Cassette tape recorder or player for the tapes provided

b. Carousel slide projector for the slides provided

c. Viewing screen on which to project the slide images

d. Pencil to work the exercises

e. Ruler or straight edge for some of the exercises

If the are unfamiliar with the necessary equipment, you should contact your school district's audio-visual section for instructions on the use of cassette tape players and carousel slide projectors. If the local school district does not have an audio-visual section then you could ask a fellow collague or local merchandizer familiar with the necessary equipment to aid you.

Supplementary Materials

Simulation

A case simulation activity has been designed to accompany this module. For better results it should be used in conjunction with the lessons in each phase. The simulation and additional items of materials listed previously can be obtained from Research for Better Schools, Inc., Philadelphia, Pennsylvania.

Reference Books

Four books have been identified as the basic reference texts for this module. These books are referenced in the lessons by chapters for additional information on the topics covered by the lessons. Of the four books, one has been designated as the primary reference book. It is the only book written specifically on project management in the field of education. The others are more global or concerned with other fields but still have much to offer to the field of education. The primary reference test is entitled Educational Project Management by Desmond L. Cook.

The student may wish to obtain or purchase one or more of these books for use while working through the module. The books are listed below.

Educational Project Management, Desmond L. Cook, Columbus, Ohio: Charles E. Merrill, 1971.

Network-Based Management Systems, R. D. Archibald and R. L. Villoria, New York: John Wiley and Sons, 1967.

Project Management, J. S. Baumgartner, Homewood, Ill.: Richard D. Irwin, Inc., 1963.

Planning by Network, H. S. Woodgate, New York: Brandon Systems Press, 1967.

Glossary

A glossary of terms relevant to educational project management is included as the last section of this manual. It is provided for your reference and use during the module instruction.

4. Student Flow Through the Module

The purpose of this section is to describe briefly the several steps which you will take in moving through this instructional module. Various pages of the module have been color-coded to help you identify them more easily.

The first item you encountered was that part of the manual which described the general nature of the module. After reading this section, you will be directed to complete a Student Information Form (blue) which provides the module developers with data to help identify the population using the materials. The form is not used to identify individuals.

Upon completing the information form, you are then directed to begin Lesson 1 which contains an inventory of project management tasks. Based upon your inventory profile, you may option to skip certain lessons of the module. The usual procedure, however, is to work sequentially through all of the lessons.

After completing Lesson 1, you will begin instruction in the four phases of project management by working Lessons 2 through 6 which focus upon the planning process. Upon the completion of Lesson 6, you will be directed to take a phase test (pink). You score the test by referring to the answers provided in the second part of the Module Manual. Your phase test answer sheet is to be mailed to the agency distributing these materials for the purpose of revising and improving the module.

After scoring and mailing the phase test, you may choose to work the first phase of an optional simulation if you have decided to use the simulation. If not, you will move directly to instruction in the preparation phase of project management by completing Lessons 7 and 8. You will then be directed to complete, score, and mail a second phase test. At this point you may choose to work the second phase of the simulation or move directly to instruction in the operational control phase of project management. Upon completing Lessons 9, 10, and 11 you will again take, score, and mail a phase test and have the option of working the third phase of the simulation. Normally, you will then move directly to Lesson 12 which constitutes instruction in the termination phase of project management. After completing Lesson 12, you will be directed to take, score, and mail the last phase test and then choose to work the fourth phase of the simulation.

You will then complete the Module Quality Control Form (blue) found in the second part of the Module Manual. This form provides information for the revision and improvement of the module as a whole. When you have done this, the module will be completed. The flow chart on the next page graphically illustrates the flow of work through the module.

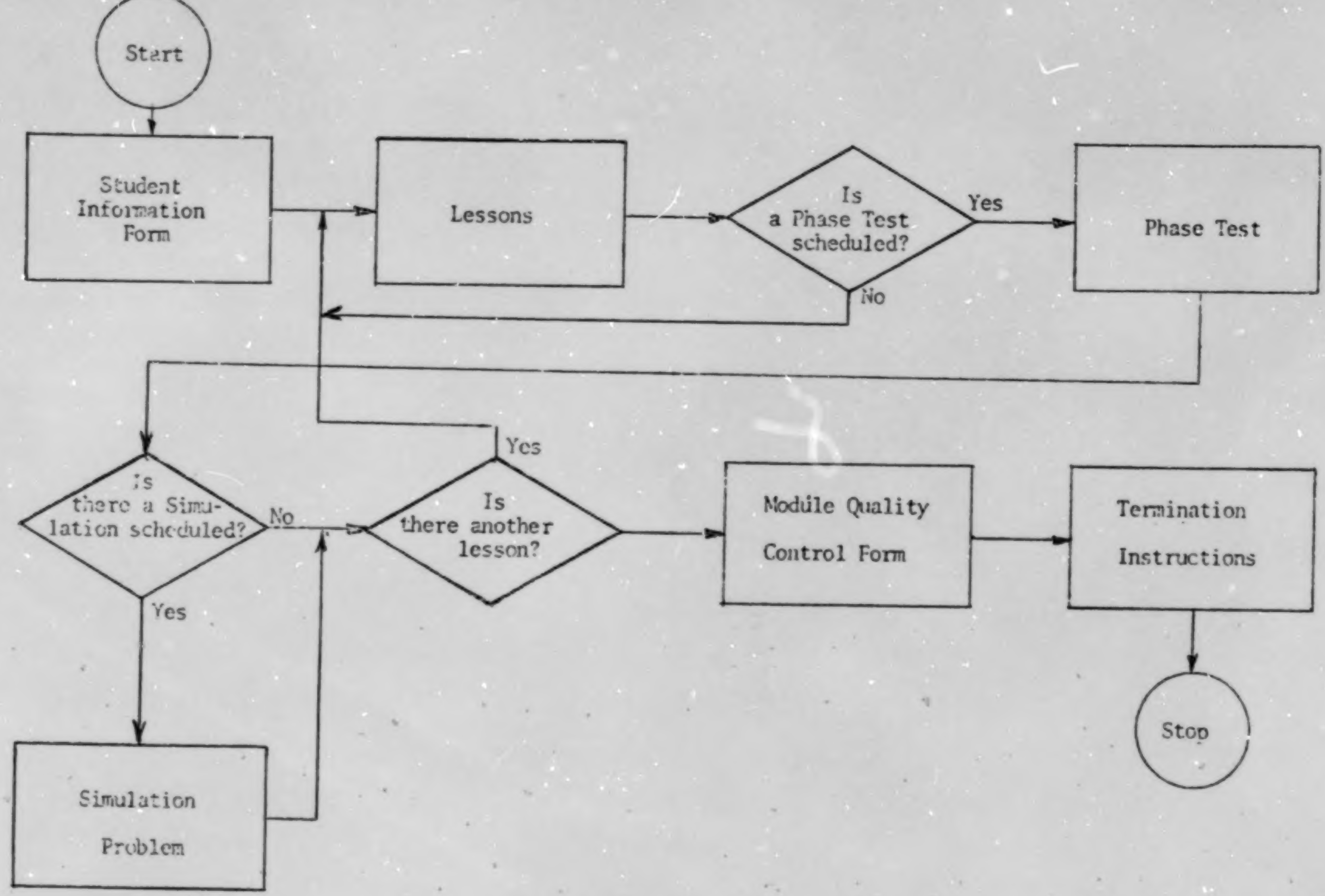

Start
Student Information Form
Lessons
Is a Phase Test scheduled?
Yes
No
Phase Test
Is there a Simulation scheduled?
No
Yes
Is there another lesson?
Yes
Module Quality Control Form
Termination Instructions
Simulation Problem
Stop

Figure 1. Student Flow Through the Module

5. Student Flow Through a Lesson

The general steps in working through an individual lesson are pretty much the same for all lessons. The purpose of this section is to describe briefly the several steps which you will carry out in completing the typical lesson in this module. Various sections of the lesson have been color-coded to help you identify them more easily.

The first item you will encounter is an Introduction to the Lesson which specifies such items as materials needed, time length, and similar items. After reading that page, you will then be directed to a section which gives an overview of the lesson plus the lesson general and specific objectives. Upon the completion of the reading of this overview and studying the objectives, you will then proceed to take a pretest (pink) over the lesson content. Upon completing the pretest, you are then directed to a page which gives the correct answers plus suggested options for you to follow depending upon your performance on the test.

The normal procedure would then be for you to proceed to a section presenting a Lesson Abstract and Content Outline. After reading the Lesson Abstract and Content Outline, you will be directed to a page giving instructions on how to set up the materials for the lesson content presentation. You can, however, move immediately to the practice exercises if your pretest performance was satisfactory.

After completing the content presentation, you are directed to a single exercise or a series of exercises (green) in which you can practice your new knowledge and skills. For each exercise, correct or suggested solutions are presented so you can evaluate your own performance.

Upon completion of the last exercise, you judge your own performance. Several options are then suggested to you if you judge your performance to be unsatisfactory. Upon satisfying yourself with regard to your competency to perform the tasks, you will normally then be directed to take a post-test (pink). After grading your post-test, you are directed to several individualizing options depending upon the correctness of your answers. For example, you might move to additional examples for study, to reading reference materials (yellow) for additional reading, or you may even rework some of the exercises.

After completing the post-test and the suggested options, your last activity will be to complete a Lesson Quality Control Form (blue) which provides information for the revision and improvement of the lesson. You are requested to return the form to the agency from which you secured the manual. When you have done this, the lesson will be completed. The flow chart on the next page graphically illustrates the flow of work through a lesson.

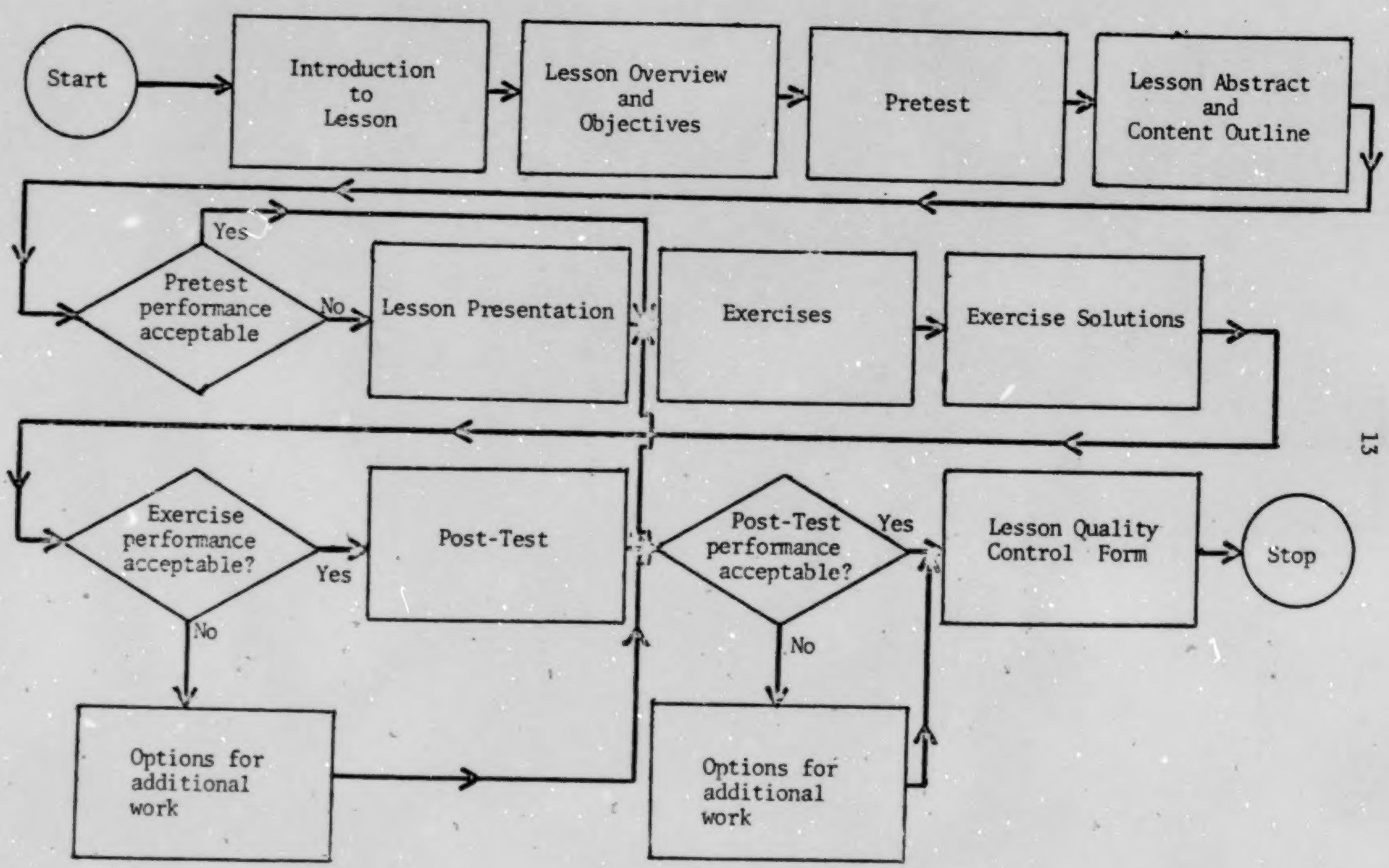

Start
Introduction to Lesson
Lesson Overview and Objectives
Pretest
Lesson Abstract and Content Outline
Yes
Pretest performance acceptable
No
Lesson Presentation
Exercises
Exercise Solutions
Exercise performance acceptable?
Yes
No
Post-Test
Post-Test performance acceptable?
Yes
No
Lesson Quality Control Form
Stop
Options for additional work
Options for additional work

Figure 2. Student Flow Through a Lesson

6. Suggestions for Group Use

This module is designed to be self-instructional. That is, an individual learner can work through the materials independent of anyone else. However, these instructional materials can be adapted for use by a group of learners. If you use these materials in a group setting, it is suggested that you follow the recommendations below.

Equipment Needs

Before starting the module, you may wish to obtain the following items in addition to the equipment needed for lesson presentation.

A. Chalkboard, chalk, and pointer

B. Overhead projector, clear overlays, and grease pencils

C. Tables and chairs

Group Directions

The group leader should:

1. Provide each learner with a module manual, the twelve lesson booklets. Also provide each learner with the Simulation Manual, the Setting Manual, and the four phase problem booklets if it is to be included.

2. Have each learner read and complete the Module Manual and the introductory sections of each lesson.

3. Bring the group of learners together for the slide-tape presentation of each lesson.

4. Have each learner complete the exercises in each lesson.

5. Bring the group together for a discussion of the problems the learners encounter in working the lessons.

6. At the conclusion of the group discussion, direct everyone to complete the Lesson Quality Control Form in their lesson booklet before proceeding to the next lesson.

7. At the end of each phase, direct everyone to complete the phase tests.

8. After completing the Planning Phase Test distribute the Simulation Manual, Setting Manual and the Phase I simulation problem. Have the learners read the materials. Distribute the other simulation problems at the appropriate times.

9. Bring the group together to discuss the solution to the problem. If the group is large, form into smaller groups of four or five people and then have the larger group discuss the solutions of the smaller groups. Group leaders may find it desirable to summarize discussion points on a chalk board or screen with an overhead projector as the group attempts to obtain consensus of opinion on the questions.

10. Compare the group solution to the form provided to see if all appropriate points were considered.

11. Complete all of the lessons and simulation problems.

12. Follow the Lesson and Module Termination Instructions and mail the appropriate forms as a group.

D. MODULE DIRECTIONS AND FORMS

1. Starting Instructions

Directions: *Start the instructional part of the module by completing the Student Information Form on the next page.*

If you are completing the module with a group wait for directions from the group leader.

2. Student Information Form (Module 2)

Directions: Please take time to carefully answer the items below. Write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated____.

Thank you for your assistance.

1. What is the title of your present position? (If graduate student, indicate most recent full-time position)

____

2. List three primary duties of your present position (If graduate student, indicate duties of most recent position).

a.

b.

c.

3. Have you completed any formal courses in management or project management?

☐ Yes ☐ No

4. If yes, briefly describe the content of these courses?

____

____

____

____

____

____

____

5. Have you had any previous practical experience utilizing project management techniques? (For example, in federally funded projects).

a.__________No, such experience
b.__________Yes, have managed projects myself
c.__________Yes, have worked on projects which used it
d.__________Other (Describe)

____

____

Fill in the last four digits of your Social Security number__________.

6. How long have you been associated with these projects?

☐ Less than 2 years

☐ 3-5 years

☐ 6-9 years

☐ 10 years or more

Directions: You are now ready to begin the twelve lessons of the Basic Principles and Techniques of Project Management Module. Find the booklet entitled Lesson 1--Introduction to Project Management and begin reading the introductory sections.

STOP! You may have gone too far.

This page indicates that the lessons and the simulation activities should take place here in the module sequence. If you are confused, see the section entitled "Student Flow Through the Module."

The next section in this manual contains the correct answers to the four phase tests.

You should complete the:
Project Planning Phase test after Lesson 6,
Project Preparation Phase test after Lesson 8,
Operational Control Phase test after Lesson 11,
Project Termination Phase test after Lesson 12.

3. Phase Test Answers

The correct answers to the four phase tests appear in this section. After completing each phase test, compare your answers to the correct answers provided. If you feel that you did not achieve at the level you desired you might review the lessons associated with that phase.

Answer Sheet

for

Project Planning Phase

1. [✓ A] B C D
2. A B [✓ C] D
3. A B [✓ C] D
4. A B [✓ C] D
5. A B [✓ C] D
6. A [✓ B] C D
7. A B [✓ C] D
8. A [✓ B] C D
9. A B [✓ C] D
10. A B [✓ C] D
11. A B [✓ C] D
12. A B C [✓ D]
13. [✓ A] B C D
14. [✓ A] B C D
15. [✓ A] B C D
16. [✓ A] B C D
17. A B [✓ C] D
18. A [✓ B] C D
19. A B [✓ C] D
20. A [✓ B] C D

Directions: After comparing your answers and satisfying any apprehensions you have, you should locate the lesson booklet and read the introductory page of the next lesson in the sequence, Lesson 7--Project Start-Up.

If you are including the simulation materials as part of the instruction of the module, turn to the Simulation Manual and work the simulation problem Phase I--Planning a Project.

Answer Sheet

for

Project Preparation Phase

1. A [✓ B] C D
2. A B [✓ C] D
3. A B C [✓ D]
4. A B C [✓ D]
5. [✓ A] B C D
6. [✓ A] B C D
7. A [✓ B] C D
8. [✓ A] B C D
9. [✓ A] B C D
10. A [✓ B] C D
11. A [✓ B] C D
12. A [✓ B] C D
13. A B [✓ C] D
14. [✓ A] B C D
15. [✓ A] B C D
16. A B [✓ C] D
17. A B C D
18. [✓ A] B C D
19. [✓ A] B C D
20. A [✓ B] C D

Directions: After comparing your answers and satisfying any apprehensions you have, you should locate the lesson booklet and read the introductory page of the next lesson in the sequence, Lesson 9--Problem Identification Through Management Reports.

If you are including the simulation materials as part of the instruction of the module, turn to the Simulation Manual and work the simulation problem Phase II--Project Preparation.

Answer Sheet

for

Operational Control Phase

1. A [✓ B] C D
2. A B [✓ C] D
3. [✓ A] B C D
4. [✓ A] B C D
5. A [✓ B] C D
6. [✓ A] B C D
7. A B [✓ C] D
8. A B [✓ C] D
9. A B C [✓ D]
10. A [✓ B] C D
11. A [✓ B] C D
12. A B C [✓ D]
13. A [✓ B] C D
14. A B [✓ C] D
15. A [✓ B] C D
16. [✓ A] B C D
17. A [✓ B] C D
18. A [✓ B] C D
19. A B C [✓ D]
20. [✓ A] B C D

Directions: After comparing your answers and satisfying any apprehensions you have, you should locate the lesson booklet and read the introductory page of the next lesson in the sequence, Lesson 12--Project Termination.

If you are including the simulation materials as part of the instruction of the module, turn to the Simulation Manual and work the simulation problem Phase III--Controlling a Project.

Answer Sheet

for

Project Termination Phase

1. A B C [✓ D]
2. A B C [✓ D]
3. A B [✓ C] D
4. [✓ A] B C D
5. [✓ A] B C D
6. A [✓ B] C D
7. A B C [✓ D]
8. [✓ A] B C D
9. [✓ A] B C D
10. A [✓ B] C D
11. [✓ A] B C D
12. [✓ A] B C D
13. A [✓ B] C D
14. [✓ A] B C D
15. [✓ A] B C D
16. A [✓ B] C D
17. A B C [✓ D]
18. A B [✓ C] D
19. [✓ A] B C D

Directions: After comparing your answers and satisfying any apprehensions you have, turn to the next page and complete the Module Quality Control Form.

If you are including the simulation materials as part of the instruction of the module, turn to the Simulation Manual and work the simulation problem Phase IV--Terminating a Project.

4. Module Quality Control Form

Directions: Please take time to carefully answer the items below. Be as specific and thorough as you can in providing comments and suggestions for revising and improving the module.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ________________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this module?

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

2. What is the most positive aspect of this module?

____

____

____

3. What is the most negative aspect of this module?

____

____

____

4. What suggestions do you have for correcting or improving this negative aspect?

____

____

____

5. How well are the lessons organized and sequenced?

☐ Excellently ☐ Very well ☐ Well ☐ Fairly well ☐ Poorly

Fill in the last four digits of your Social Security number ________.

6. How difficult is the module?

☐ Very difficult ☐ Difficult

☐ Moderately difficult ☐ Somewhat difficult

☐ Rather easy

7. What is your impression of the quality of the module manual?

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

8. For how many lessons did you view the slide/tape presentation?

☐ None ☐ 1-3 ☐ 4-6 ☐ 7-9 ☐ 10-12

9. Indicate how helpful the slide/tape presentations were in the instructional process for the lessons that you viewed them?

☐ Extremely helpful ☐ Quite helpful

☐ Very helpful ☐ Somewhat helpful

☐ Not helpful

Turn the page and follow the Termination Instructions.

5. Termination Instructions

Upon completion of the Module Quality Control Form, please:

1. Tear out the following items if you have not already done so.
   a. The blue Student Information Form,
   b. The blue Module Quality Control Form,
   c. The green Project Management Inventory Summary Sheet from Lesson 1,
   d. The twelve blue Lesson Quality Control Forms, and
   e. The four pink phase test answer sheets.
2. Staple them together (one packet of forms for each student).
3. Place the forms in the special envelope provided.
4. Mail the envelope to: Research for Better Schools, Inc.
   Suite 1700
   1700 Market Street
   Philadelphia, Pennsylvania 19103

You have now completed the Basic Principles and Techniques of Project Management Module of the Educational Project Management Instruction System (EPMIS). If you desire more information about EPMIS, turn to the preface of this Module Manual and/or write to the address shown above.

E. Glossary of Project Management Terms

ACTION, ALTERNATE COURSE OF (ALTERNATIVE) -

A proposed management action that may be selected for implementation to correct a deviation.

ACTION, CORRECTIVE -

Management action that can be implemented to correct the cause of a deviation.

ACTION, ADAPTIVE -

Management action that can be implemented to minimize the effect of a course of action if the cause cannot be corrected.

ADMINISTRATION -

A process involving the execution of management decisions within an organizational framework utilizing pre-established rules for decision-making.

ANALYSIS -

The process of breaking a total into its constituent parts and examining these parts to determine their nature, proportion, function, and interrelationships.

ANALYSIS, POTENTIAL PROBLEM -

The analysis of problems that may occur when a selected course of action is implemented. It involves identifying potential problems, determining their possible cause and the probability of its occurrence, determining the action to prevent the cause or to minimize its effect, and developing a procedure for handling the most serious problems if they occur.

AUTHORITY -

The right to act, to make decisions, or to command others.

BUDGET -

The expression in financial terms of management plans for funding a project over a specific time period.

CASE-SIMULATION -

An exercise developed from or expressing an actual condition which is used to illustrate, practice, or reinforce learned principles and skills.

CONSEQUENCES -

The negative effects of implementing a given course of action. They should be identified and the probability of their occurrence should be determined before fully accepting a given course of action.

CONTROL -

Basically a problem-solving process involving three steps--problem identification, problem solution and solution implementation; in project management terms, deviation identification and analysis, decision-making through alternative creation, and selection and alternative implementation.

COSTING UNIT (OR COST CENTER) -

A unit of work, usually a work package or a specific function or task, around which various costs are accumulated.

CRITICAL PATH -

The longest or most time consuming pathway within a network of various paths relating the activities required between the start and finish of the project.

DECISION BOX -

A condition or point in a process where a choice is to be made between two or more alternatives.

DECISION, GO/NO GO -

The process utilized for accepting or requesting an alternative course of action for consideration if it satisfies and does not satisfy the "needs" respectively.

DECISION-MAKING -

Identifying and selecting from possible alternative courses of action the best possible course of action.

DETERMINISTIC SYSTEM -

The interaction of the components of this kind of system can be predicted without risk of error if the facts or information which the system is required to handle are known. The outcome of a deterministic system is determined exclusively by the values of the input and the fixed process.

DEVIATION -

A difference between a planned situation and an actual situation, a project management problem.

DEVIATION, CAUSE OF -

The unplanned or unanticipated change in the project that will yield a deviation. The effect of a cause is a deviation.

DIRECTING -

Primarily a process of motivating employees to accomplish their tasks. It requires the establishment of an environment conducive to accomplishing effort.

DIRECT COSTS -

Costs for those resources obtained especially for the activity or project tasks and necessary for its completion.

ENDS (RESULTS AND RESOURCES) -

The first consideration and the objectives in decision-making. The specification of what one wants to accomplish and the identification of the resources that are to be utilized.

EVENT -

A definable point in time where some action or activity begins or ends. It is a recognizable instant in time which does not consume time or resources. Usually identified in network management systems by a circle.

EVENT-ORIENTED DIAGRAM -

A chart which visually shows the interrelatedness and sequence of the various activities or tasks necessary to the completion of a project where the fact of start or finish of an activity is identified by using a circle.

EXCEPTION PRINCIPLE -

Control by identifying only significant deviations at specified points between "what is" and "what should be" or planned.

EXPENDITURE PLAN -

A set of planned decisions concerned with financial outflow and answering questions such as:

What is to be purchased?
When is the item to be ordered?
Where is the item to be purchased?
What weekly or monthly rate is to be used for the item?
How is the item to be purchased?

GANTT CHART OR TASK-EVENT CALENDAR -

A tool for planning work and relating activities to time or schedule. In a GANTT Chart, the horizontal axis represents time and the vertical axis lists tasks or activities to be accomplished.

GEAR-UP PHASE -

The activities involved in the period after approval of the proposal and before the project operational activity phase. Consists of bringing together resources necessary to start the project operational phase, and identifying and establishing policy and procedures, and creating the project information system.

GOAL -

A broadly stated end point to be reached in the future. In the project, a goal is a collective activity, identified as the end product, and is at the top level of hierarchial work breakdown structure.

GOAL ORIENTED -

Activity that is aimed toward some defined goal or end product.

HANDBOOK, PROJECT -

A formal or informal document containing basic information about project goals and tasks, policy statements and procedures guidelines, organizational relationships, and similar items for use by project manager and personnel in day-to-day operations of the project.

HIERARCHIAL APPROACH -

A ranging of systems by complexity from general to elementary with the result that a hierarchial diagram of the systems and subsystems resembles a "tree".

A ranging of objectives from broad to specific, with the assumption that accomplishment of specified objectives will contribute to the attainment of the next higher objective in the hierarchy.

HISTORY, PROJECT -

Optional informal report at end of project which reviews and summarizes the major action of the project.

INDIRECT COSTS -

Costs accounted to a project which are often pro-rated since they cannot be adequately identified with a costing unit. Examples are heat, electricity, and other general facilities which are shared with the organization in which the project is housed.

LEAD TIME -

The time between the procurement or order of a resource and its need or use in the accomplishment of an activity.

"LIKES" -

Those ends or decision-making objectives that are desirable features that alternative courses of action may satisfy to some degree. They are not absolutely necessary and can be ranked or weighed to establish their desirability.

LIMITS -

The allowable tolerance for acceptability of the standards specified for time, cost and performance at project control points. Limits may be either positive or negative or both with respect to the standard set.

MANAGEMENT -

The method of attaining organizational goals by 1) developing a plan; 2) arranging operations in conformity to the plan; and 3) creating an environment which is favorable to the performances of the people belonging to the organization. It is a process which involves a high degree of uncertainty and unprogrammed decision-making.

MEMORANDUM, CHANGE -

A structured document utilizing project planning thinking to aid in implementing a selected course of action and changes to the project.

MILESTONES (MILESTONE EVENTS) -

Important events identified in the work flow of a project such that if not completed on time the project goal will not be attained on schedule or possibly not achieved at all.

MISSION -

A mission is composed of several tasks and is itself a sub-goal. A mission is focused activity, or package of work, using a limited amount of project resources and staff at the middle level in the hierarchial work breakdown structure.

MOST LIKELY TIME -

The estimated average time needed to complete an activity based upon some experience with a similar activity.

"NEEDS" -

Those ends or decision-making objectives that must absolutely be satisfied by any acceptable course of action.

NETWORK (FLOW DIAGRAM OR WORK FLOW) -

Consists of interrelated activities and events which must be accomplished to reach the project goal. The flow diagram shows the planned sequences of accomplishment, interdependencies, and interrelationships of activities and events.

NOMINAL (CODING) -

A classification of some entity into well-defined physical categories where numerical attributes and order are not important to the classification.

OBJECTIVE(S) -

Statements which specify a desired outcome. The statement can be one which includes a broad area of concern or need or it can specify an extremely narrow concern. Goal, mission, and task statements attempt to redefine objectives depending on the extent of concern from broad to narrow.

OPTIMISTIC TIME -

The time estimated for the completion of an activity when it is assumed that everything will go extremely well.

ORGANIZING -

The establishment of an integrated system of authority and responsibility relationships in which the members know what their tasks are and how they fit into the scheme and have the requisite authority and responsibility to accomplish these tasks.

PHASE-OUT -

Closing out the project when the objective or end product is realized or accomplished.

PLAN, IMPLEMENTATION -

A structured document to aid the project manager to implement a selected course of action.

PLANNING -

A process of determining objectives, defining and evaluating alternative courses of action, and selecting the course which will most effectively and efficiently achieve the established objectives.

POINT, PROCESS CONTROL -

A monitoring point, calendar date, dollars allocated, and performance standard, in the operational process of the project where one can conveniently determine deviations to control the process.

PROGRAM EVALUATION AND REVIEW TECHNIQUE (PERT) -

A management system for planning and controlling many activities related to the accomplishment of an objective in a once-through effort.

PESSIMISTIC TIME -

The time estimated for the completion of an activity when it is assumed there will be difficulty, the task is uncertain, or there is unfamiliarity with the task.

POLICY -

A policy is a general statement or rule which guides or channels thinking in decision-making. It can be formally stated or a result or practice over time.

PRINCIPLE OF EXCEPTION (SEE ALSO EXCEPTION PRINCIPLE) -

Principle of management by exception is a method of management control by which only those events and/or activities significantly deviating from plan are brought to the attention of the manager for action.

PROBABILISTIC SYSTEM -

Uses statistical analysis of past behavior to predict future behavior. Less certain predictions than that of a deterministic system. However, more systems can be described in probabilistic terms than in deterministic ones.

PROBLEM -

Deviation from a plan or a variance between what is and what is desired.

PROBLEM ANALYSIS -

The process of identifying and defining a deviation from plan and determining its specific cause.

PROCEDURE -

Guide to routine actions emphasizing a chronological sequence. Practices which are so re-current and routine as to lend themselves to formalized response.

PROGRAM -

A complex of policies, procedures, rules, tasks, resources, and associated elements necessary to carry out a given course of action.

PROGRAMMED DECISION -

Decisions which are basically repetitive, routine and procedural and where the decision rule is pre-determined.

PROJECT -

A set of interrelated and interdependent tasks that have to be accomplished to reach an objective or objectives within time, cost, and performance specifications and possessing a degree of uncertainty of how to achieve the goal.

PROJECT INFORMATION BASE -

A management information system consisting of planned cost, schedule, performance data used to compare against actuals.

PROJECT DEFINITION -

A process which involves the development of explicit statement of the project's primary objective goal and the necessary sub-objectives to reach the major goal. The development of a work breakdown structure is used as one technique in defining the project.

PROJECT MANAGER -

The one individual who is responsible for the successful accomplishment of a project.

PROJECT MANAGEMENT PHASES -

- Planning
- Gear-up/Implementation
- Operational Control
- Termination

ORGANIZATIONAL CHART -

Subdivision of major functions into smaller supporting functions with a delineation of specific responsibilities and authority for or at each level.

PROJECT TRANSITION -

The termination of the project where the results are phased into operational use or into another project.

REPORT, FINAL -

A formal report, usually required by the contractor, which documents the efforts of the project in accomplishing its goals and objectives.

REPORT, PROGRESS -

A report describing the progress of project utilizing the project plan to indicate events and activities completed, to describe the activities in progress and to reconsider the events and activities in the future.

REPORT, STATUS -

A report that indicates the current status of the project so that one can compare it to the project plan.

REPORT, TOP MANAGEMENT -

A report to top management for information on problem solution in the projects containing the following items: description of the deviation, cause of the deviation, two or three alternative courses of action, selected course of action, reasons for selection, and the action implementation plan.

RESOURCE ALLOCATION -

Translating an approved plan into a schedule by assigning resources to accomplish the planned activities during a specific calendar period. The process of applying resources toward the accomplishment of a plan, procedure, policy, tactic, or strategy.

RESOURCE COMMONALITY TABLE -

A shopping list prepared to identify the total required resources for an activity after the resources had been leveled. It contains the following column headings:

1) Resource item description
2) Quantity required after leveling
3) The lead time required to obtain the resource
4) The order date for procuring the resource

RESOURCE LEVELING PROCESS -

A process that deals with efficient resource allocations by adjusting the time for scheduling some activity such that a unit of resource (manpower, equipment, or material) can be shared with other scheduled activity so as to permit the purchasing of fewer units of that resource item.

RESPONSIBILITY -

The obligation to use granted authority to direct that effort which is necessary to be performed according to plan.

SCHEDULING -

The translation of the plan into a time table showing the specific calendar dates for the start and completion of work.

SCORE, SATISFYING OR FITTING -

The score given to an alternative on how well it satisfies or fits a given "like".

SEQUENCE DIAGRAM -

Used to illustrate the interrelationship of activities or events to achieve a goal. The logic used in developing such a work flow sequence is antecedent-consequent logic where one activity or event is related to another by time.

SLACK PATH -

A pathway through a network along which actual activity is occurring and requires less time to complete than the most time consuming or critical path.

STANDARDS -

The specification set for time, cost and performance at control points. If they are met then the project is proceeding according to plan.

SYSTEM -

An entity, conceptual or physical, which consists of interrelated or interacting parts directed toward some overall goal or purpose. For management, a logical arrangement of interdependent and interrelated parts into a connected whole to accomplish a specified objective.

SYSTEMS ANALYSIS -

The process of breaking the system down into its interrelated parts. In project definition it is an orderly approach for defining a set of objectives or goals, for analyzing and describing a given organization structure using significant factors and communications, and then determining what arrangements of factors and communications will achieve the desired effect.

SYSTEM, PROJECT MANAGEMENT INFORMATION -

A system that stores and provides management information for project decision-making utilizing the project plan and the project reporting system.

SYSTEM, REPORTING -

A system of transmitting information utilizing reports so that the actual project situation can be compared to the planned project situation.

TASK -

A task, or in some cases a sub-task, is the smallest unit of action. A task is a single activity or an element of a work package which uses a single person of the staff and little resources and is at the lowest level of hierarchial work breakdown structure.

TASK-EVENT CALENDAR (SEE GANTT CHART)

TASK RESOURCE SCHEDULE -

A tool or device which is used to identify, estimate quantity, and schedule the resources which support a specific task.

TERMINATION -

Stopping of effort due to a lack of funds, failure to meet contract conditions, or similar reason, before project objectives reached.

TRANSITION -

Institutionalizing the end product of a project or absorbing the effort into an existing organizational unit.

UNPROGRAMMED DECISIONS -

Decisions which deal with unstructured, novel and consequential issues and for which there are no pre-determined rules.

WORK PACKAGE -

A specific job to be accomplished which is usually within the responsibility of one operating unit in an organization and makes up one item on the work breakdown structure.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 1 -- Introduction to Project Management

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 1--Introduction to Project Management

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet for Basic Principles and Techniques of Project Management

Introduction to lesson 1.1
Overview and objectives 1.2
Pretest 1.3
Lesson abstract and outline 1.5
Lesson text 1.8
Exercises 1.15
Post-test 1.29
Additional example 1.31
Reading references 1.33
Lesson Quality Control Form 1.34

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 1--Introduction to Project Management."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques Project Management, Lesson 1--Introduction to Project Management."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 10 minutes, the exercise takes approximately 30 minutes, and about 50 minutes is needed to complete the entire lesson.

Turn the page and read the Overview and Objectives.

Lesson 1--Introduction to Project Management

Overview and Objectives

OVERVIEW

This lesson is the introductory lesson of the Basic Principles and Techniques of Project Management module. The lesson should orient you to the total module and provide you with the sequence of the topics that will be presented in the module.

This lesson will also introduce you to the basic terms used in project management and specifically to the concepts "project" and "project management". One of the exercises in the lesson is the Project Management Inventory. The inventory should help you determine in what areas you have strengths and weaknesses. The succeeding lesson will be concerned with project definition and work breakdown structure utilized in the planning phase of a project.

OBJECTIVES

As a consequence of participating in this lesson, the following objectives should be reached: The student should be able to

1. Define the concepts of project and project management.
2. Identify the major principles and functions of management.
3. List and describe the lifecycle phases of a project or the major missions of project management.

Turn the page and complete the pretest

Lesson 1-Introduction to Project Management

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that, the pages can be identified in the event they become separated ______________.

1. While there are many definitions of management, what is perhaps the most general one?

   A. Decision-making related to allocating resources and directing the actions of people toward the attainment of desired ends by optimal means
   B. Administration of policies and procedures established by higher authority
   C. Securing personnel and keeping cost records
   D. Arranging people in patterns of relationships relative to authority roles

2. What would be an example of an "educational project" in a school district?

   A. Established curriculum program
   B. Cafeteria operation
   C. Driver education summer program
   D. Instructional materials development activity

3. Do any time, cost and performance trade-off's occur in the development of the end product of a project?

   A. Yes, but only time and performance
   B. Yes, all three often occur
   C. No, they are only of concern in the project planning phase
   D. No, they can be overlooked in solving project problems

4. What is probably the most important management factor in the successful completion of a project?

   A. Private funding
   B. Cooperation from other school offices and departments
   C. A large research staff
   D. Project manager competency

5. What are generally considered as the basic functions of management?

   A. Planning, preparing, controlling and terminating
   B. Planning, organizing, directing and controlling
   C. Cost allocation, directing, scheduling and terminating
   D. Planning, scheduling, preparing and controlling

6. Project management can be discussed at what level in a school district?

   A. Only at a school system level
   B. Only at a single project level
   C. Both at a school system level and a single project level
   D. Only at a departmental level

7. What are the four principal phases in the life span of a project?

   A. Planning, preparaing, controlling and terminating
   B. Planning, controlling,terminating and evaluating
   C. Planning, management, evaluation and termination
   D. Planning, organizaing, directing and controlling

8. What major activities comprise the planning phase of the project life cycle?

   A. Specifying goals and objectives, determining equipment, personnel, materials, facilities and information needs
   B. Specifying goals and objectives, determining flow of tasks, estimating time schedules, determining costs, manpower needs, and preparing a budget.
   C. Doing needs assessment, writing proposal and approving the budget
   D. Securing personnel, facilities, equipment and space

9. What phase of the project life cycle usually involves the detection and correction of deviations in order to insure successful accomplishment of the project goal?

   A. Planning
   B. Preparation
   C. Evaluation
   D. Operational control

10. The termination phase refers to closing out the project at what point?

    A. End of school year
    B. The project goals are achieved
    C. Project members take new positions
    D. Evaluation report is completed

11. What is considered as the primary responsibility of a project manager?

    A. Only to prepare the project report
    B. To make decisions regarding implementation of all tasks
    C. To prepare a project manual
    D. To accomplish project goals within time, cost and performance specifications

Indicate whether the statements listed below are true or false by writing a T or F on the line.

12. __________ A project has a finite life span

13. __________ Specifying tasks and workflow in a project is the duty of the project staff.

14. __________ The project preparation phase involves the activities of estimating time schedules, costs, and manpower needs.

15. __________ The role of a project manager involves decisions and actions which make him the planner and integrator of project activities.

Turn the page and check your answers.

Lesson 1--Introduction to Project Management

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 1 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of projects and project management and should read the lesson abstract and content outline on pages 1.5 and 1.6 . Then begin the tape-slide presentation by turning to the instructions on page 1.7 .

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the process and should read the lesson abstract and outline beginning on page 1.5 . Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 1.15. If you do desire to view the tape-slide presentation turn to the instructions on page 1.7 .

Multiple Choice

1. A
2. D
3. B
4. D
5. B
6. C
7. A
8. B
9. D
10. B
11. D

True/False

12. T
13. F
14. F
15. T

Lesson 1--Introduction to Project Management

Lesson Abstract and Content Outline

ABSTRACT

An orientation to the module is provided by identifying the lessons connected with each phase of the life span of a project. The components constituting the lessons are described and the term "project" is defined and described in some detail. Project management is explained and the functions of management are described. The role and some of the duties of a project manager are identified.

CONTENT OUTLINE

A. Organization of materials presented in the module are described.

   1. Written information is provided, both on projects and on project management as a specific knowledge area.

   2. Visual information using a group of cartoon-like characters is presented utilizing a set of slides.

   3. Coordination between the written information and the visual illustrations takes the form of a tape/slide presentation.

   4. The practice of knowledge is presented through lesson exercises.

   5. Integrated practice of knowledge is presented through a case simulation.

B. Introduction to concepts in project management.

   1. Analysis of the instructional package offered in project management yields eleven areas, each of which is the subject of a lesson that are grouped within four large-scale phases:

      a. planning
      b. preparation
      c. operational control
      d. termination or transition

2. A definition of the term project is stated.

   A project is a unique goal-oriented activity, characterized by uncertainty about the path leading to the goal and delivering some definable end product within time, cost, and performance specifications.

3. Definition of the term project management is stated in two settings.

   a. School system management across many projects.
   b. Management of a single project.

4. The functions of management are described.

   The functions are:
   a. planning
   b. organizing
   c. directing
   d. controlling

5. The role and duties of a project manager are described.

   a. Roles such as planner, integrator, evaluator, implementor and decision-maker are identified.

   b. His primary responsibility is to accomplish project goal within time, cost and performance specifications.

   c. Duties such as goal setting, planning, time estimation, scheduling, resource allocation, budgeting, direction and control are pointed out.

Lesson 1--Introduction to Project Management

Instructions

1. Set up the recorder, projector, and screen.
2. Place the carousel slide tray onto the projector and advance to the slide marked "Module 2--Basic Principles and Techniques of Project Management, Lesson 1--Introduction to Project Management."
3. Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.
4. Start the recorder and advance the slides with the "change tone."

Lesson 1--Introduction to Project Management

Lesson Text

Introduction

The purpose of this module is to introduce you to the various phases of the project management process and to the basic principles and techniques of project management. It will help you to acquire the knowledge and skills required to manage a project effectively.

This first lesson deals with the concepts involved: project, management, project management, and the role of the project manager.

Characteristics of a Project

What is a project? The concept of a project can be understood by examining some of its main characteristics. A project is an activity which is goal-oriented, has some uncertainty about the manner in which it will be accomplished, has a finite life span and a cost limit.

Goal-oriented means that the activity is aimed toward some identifiable end-product or capability. It is characteristic of project activity that its end-product or capability be defined or specified in such detail (performance specifications), that the outcome of the activity and a means for evaluating the outcome is readily available to the individuals involved in the project and to individuals monitoring, auditing and evaluating the project.

Uncertainty is a main characteristic of projects because they are usually a unique or once-through kind of effort, and often there is uncertainty about how the goal will be accomplished. The amount of uncertainty varies from project to project, depending upon factors such as the uniqueness of the effort and the inherent complexity of the overall project task. Staff inexperience may also result in uncertainty.

Having a finite life span means that an activity possessing a beginning and an end. Thus, a project has specified start and completion dates and consequently can be thought of as a temporary effort. This aspect of projects has led many experts in the field of management to refer to projects as temporary systems, in order to distinguish projects from non-projects. On-going activities which do not have specified start and completion dates are referred to as functional activities or permanent systems.

Finally, the project goal must be achieved within a specified cost limit. Project efforts involve the use of resources, such as time, people, facilities, materials, equipment and services. These resources are usually translated into dollar amounts in a budget document which specifies the project cost limit that is not to be exceeded.

Thus, projects have the following characteristics: a specified goal to develop and end-product or capability, some uncertainty about how the goal is to be achieved, start and completion dates, and a cost limit.

Various activities carried on by a school district can be compared with each of the above mentioned characteristics in order to identify which are projects and which are not. Such a comparison is presented in Figure 1.

Management Functions

In order to have a workable understanding of project management it is essential to develop an understanding of the concept of management. In discussing management and its functions, we assume that a formal organization of superior-subordinate relationships exists. In this framework, the function of management is to create an environment which will allow the employees to function effectively by creating the appropriate work conditions for them.

Figure #1

Classification of Sample School Activities as Projects or Non-Projects

Project Characteristics / Activity Descriptions	Specified End Product or Capability	Performance Specifications	Uncertainty	Start and Completion Dates	Cost Limit
*Development of Plan for School Desegregation	Yes	Yes	Yes	Yes	Yes
School District Payroll Operation	Yes	Yes	No	No	Yes
*Implementation of New Math Program	Yes	Yes	Yes	Yes	Yes
*Construction of New Open-Space Elementary School	Yes	Yes	Yes	Yes	Yes
Twelfth Grade English Literature Program	Yes	Yes	No	No	Yes

* Classified as "projects" since they possess all of the necessary characteristics.

Management involves making decisions about the allocation of resources and the direction of people, so that the desired end will be attained most efficiently. You manage when you plan, organize, direct, and control the use of resources. These four basic activities are the functions of management.

Project management incorporates the basic management functions and is the process of making decisions about the accomplishment of a project goal through the execution of a temporary effort characterized by time, cost and performance specifications.

Managers, whether they be heads of governmental agencies, college deans, departement heads, superintendents or principals, are all engaged in getting things done with people. Managers perform the same functions regardless of their level in the organization or the type of enterprise they are pursuing. Only the techniques of applying the functions are modified from situation to situation.

The most typical or accepted method of classifying management functions is to group them according to the activities of planning, organizing, directing (or motivating), and controlling. It is often impossible to place each management function neatly into one of these categories, since they tend to overlap; however, this classification is helpful and workable.

Planning involves making a set of initial decisions about the optimum allocation of resources to set of tasks aimed at attaining specific desired goals. It consists of the activities of setting goals, delienating work, scheduling the work-flow, determining the time and resources (money and manpower) required to achieve the goal, costing the resources and preparing a budget.

Organizing involves arranging selected people in patterns of relationships relative to authority, responsibility, roles and accountability in order to facilitate the accomplishment of desired goals. It includes, therefore, recruiting, selecting, training and assigning persons to accomplish the activities. This sub-function of organizing is called staffing. Organizing is also manifested in the preparation of policies, procedures, and practices related to project operations.

Directing involves the employment of diverse forms of human interaction aimed at leading, motivating and guiding people in the performance of their tasks. It also involves guiding and supervising subordinates who require clarification of assignments, guidance toward improved performance, and motivation in order to confidently achieve the stated goal.

Controlling involves the detection of deviations between what is planned and what is acutally happening, the analysis of the deviation, a proposed solution and the implementation of corrective action to insure the successful accomplishment of the goals. The controlling function is operationalized through an iterative problem-solving process.

Occasionally, there is a concern about the order in which these functions are, or should be, performed. Planning is generally considered first, while organizing, directing and controlling follow in sequence. In practice, the functions are carried out concurrently. Furthermore, the functions overlap, so that a manager is often performing several functions simultaneously.

Management, then, is the process of applying these four basic functions to the operation of an on-going program. That is, management is concerned with making decisions about how to accomplish the ends of an on-going program, through the execution of the general management functions of planning, organizing, directing and controlling.

Definition of Project Management

Project management incorporates the basic functions of the management process. It is the application of the basic management functions of planning, organizing, directing and controlling to the operation of a project. Recalling that a project has a finite life and, hence, is of a temporary nature, project management can be thought of as the management of a temporary effort, and is, thus, sometimes referred to by management experts as a temporary system.

In a local school district setting the techniques of project management can be applied both to the school system as such and also to single projects within it. At the school system level, the management of projects is concerned with planning, organizing, directing, and controlling an organizational structure which facilitates the management of numerous individual projects simultaneously and on an on-going basis. This level of management is dealt with in Module Four, entitled "Organizing a Project Management System." The project Management concept being studied in this module focuses on the second level--the management of single project.

Project Management Phases

The life span of a single project can be divided into four periods, termed the planning, preparation, operational control and termination phases. The project planning phase includes setting goals for the project; specifying the work to be done by providing a descriptive flow of the tasks; determining time schedules, material and manpower needs; and preparing a budget. The preparation phase involves obtaining and organizing personnel, equipment, materials, facilities, and information so that the project can be initiated and operated as planned. The operations phase consists of those activities and efforts concerned with the actual conduct or operation of the project. It is also aimed at detecting deviations, analyzing the problem causing the deviations, considering alternative solutions, making decisions, and implementing those decisions in order to insure the success of the project. Finally, the termination phase includes those activities or efforts dealing with the ending of the project. Such activities include reporting about the project and the transfer of personnel, records and equipment. This phase may focus upon stopping a project in progress, ending a project when its goals have been achieved, or on integrating the project activities into an on-going institutional program upon completion of the project.

Role of the Project Manager

Studies of project management indicate that one of the most important factors in the successful completion of a project is the knowledge and skill possessed by the project manager. The role of a project manager makes him the planner, integrator, organizer, director, implementor, operator and controller of the entire project effort. Some of the project manager's specific duties include establishing project goals, specifying tasks and work flow, scheduling time, allocating resources, preparing the budget, delineating responsibilities for the staff, and reviewing, evaluating and controlling project activities. The primary responsibility of the project manager, however, is the accomplishment of the project goal within time, cost and performance specifications.

Turn the page and read the directions for Exercise A.

Lesson 1--Introduction to Project Management

Exercise A

Directions: This exercise is concerned with some of the more important concepts presented in the lesson narrative. Complete the items appearing below. Not all spaces need to be used in answering the items.

Upon completing your answers turn to the page following the exercise. The solution to the exercise appears on that page. Determine how well you have performed by comparing your answers to the item solutions provided.

1. List the phases of the life span of a project or the elements of the mission analysis of project management. (The phases and the elements correspond)

2. List the four functions of a manager.

3. List the concepts or elements which you would use to identify projects when discriminating projects from non-projects on a list of descriptive activities. Projects have:

Lesson 1--Introduction to Project Management

Exercise A--Solution

Directions: Given below is the solution for exercise A. Your solution should not deviate considerably from it. After you have checked your answer, proceed to the next exercise.

1. List the phases of the life span of a project or the elements of the mission analysis of project management. (The phases and the elements correspond)

planning	*controlling*
preparation or implimentation	*termination or transition*

2. List the four functions of a manager.

planning	*directing*
controlling	*organizing*

3. List the concepts or elements which you would use to identify projects when discriminating projects from non-projects on a list of descriptive activities. Projects have:

goal orientation (end product)	*cost allocations*
path uncertainty	*performance specifications*
time schedules	

Turn the page and proceed to the next exercise.

Lesson 1--Introduction to Project Management

Exercise B

Directions: The ability to identify activities that may be projects and non-projects is basic to project management. This exercise is concerned with this ability.

A list of descriptive activities appears on the page following this page. Using the list complete the questions below. Not all spaces need to be used in answering the questions.

Upon completing your answers turn to page 1.19. The solution to the exercise appears on that page. Determine how well you have performed by comparing your answers to the solutions provided.

1. List by number those descriptive activities which appear to be appropriate to project management.

Activity Number	Activity Number

2. Utilizing the solution to question 3 of Exercise A list the necessary elements missing from those activities which you have identified as non-projects. Identify the non-projects by number and list the elements.

Activity Number	Elements missing

Lesson 1--Introduction to Project Management

List of Descriptive Activities

1. The elementary mathematics program as identified y the K through 6 printed workbook material and textbooks.
2. A committee action directed to make a detailed investigation of the need for an electronic computer data processing system for the school with the recommendation to be reported by July 1.
3. The staff effort focused on planning, making arrangements for, and conducting the second semester adult education program where plans are to be approved by the Superintendent on or before December 1.
4. A committee to investigate and report by September 1, selection of a textbook for the 9th grade science program.
5. The staff activity involved in accounting for expenses within the various appropriation categories.
6. A group composed of administrative staff and citizens of the Advisory Committee who are to develop a program and to conduct voter-orientation meetings for the purpose of getting an approval for a bond or operating levy at the May primary election.
7. The group of coaches successfully conducting the inner-scholastic athletics for the school.
8. The administrative staff assigned responsibility to develop procurement policies and selection criteria for acquisition of buses, these policies to be reported prior to a specific date.
9. The foreign language education program operated by the language teacher at the high school.

Lesson 1--Introduction to Project Management

Exercise B--Solution

Directions: Given below is the solution for exercise B. Your solution should not deviate considerably from it. After you have checked your answer, proceed to the next excercise.

1. List by number those descriptive activities which appear to be appropriate to project management.

Activity Number	Activity Number
2	6
3	8
4	

2. Utilizing the solution to question 3 of Exercise A list the necessary elements missing from those activities which you have identified as non-projects. Identify the non-projects by number and list the elements.

Activity Number	Elements missing
1	goal, start/stop times, performance specifications
5	all missing except path uncertainty
7	" " " " "
9	" " " " "

Turn the page and proceed to the next exercise.

Lesson 1--Introduction to Project Management

Exercise C

Directions: Read the following and complete the inventory beginning on the next page.

Recognition has been given to the possibility that the student may have already acquired some of the skills needed for effective management of projects through reading, conferences, and/or direct management experience. The purpose of this inventory is to secure some measure of what you may already be able to do before starting the lessons. Should you already possess selected skills and concepts, you may want to skip some of the lessons.

Listed on the following pages are various skills and tasks that a project manager should possess and be able to perform. For each task, rate your own possession of the skills by using the scale provided. Be honest since your own learning is involved. After you have completed all items, turn to page 1.25to determine how to score your paper and make a profile.

Rate yourself on each item by circling the number which you feel best represents your competency at the task according to the following interpretation of the numbers.

1 - Expert Knowledge. I am an expert at performing the task. I am the type of person to whom other people come to for advice.

2 - Extensive Knowledge. I can undertake to perform this task in a project, but would need expert advice occasionally.

3 - Good Knowledge. I can make an immediate and significant contribution to the performance of this task in a project, but would need further experience to carry the task out on my own.

4 - Some Knowledge. I have limited first-hand experience and knowledge to perform this task through working with other people in a minor capacity or previous learning.

5 - No or Slight Knowledge. I have no first-hand knowledge to perform this task and/or have only knowledge of the task's relevance through discussions with other people.

Project Management Inventory

TASK	RATING				
1. Recognize constraints on expenditure schedules and rates imposed by federal, state and local regulations.	5	4	3	2	1
2. Establish an expenditure plan (budget) which is a single document that lists all cost estimates.	5	4	3	2	1
3. Realize that it is necessary to have personnel and resources on start up date.	5	4	3	2	1
4. Create a plan for project "gear-up."	5	4	3	2	1
5. Assemble and store those project records which are required to be retained by contractor and parent organization.	5	4	3	2	1
6. Start work-action on plan.	5	4	3	2	1
7. Design, set up, and initiate a project information system for the project.	5	4	3	2	1
8. Determine cost for contracted services (computer, printing/reproduction, consultants).	5	4	3	2	1
9. Make use of reference materials or consultants to obtain information on manpower/skill work rates.	5	4	3	2	1
10. Create a plan for the implementation of a decision.	5	4	3	2	1
11. Break down the broad project goal into sub-goals (missions) and breakdown the missions into sub-missions (tasks).	5	4	3	2	1
12. Recognize significance of deviation from the plan.	5	4	3	2	1
13. Make a decision from alternatives and set criteria for decision.	5	4	3	2	1
14. Determine the full time, part time, or on consultant basis skill persons required.	5	4	3	2	1
15. Recognize deviation from the plan.	5	4	3	2	1
16. Establish the administrative routine, policies, and procedure statements or handbook.	5	4	3	2	1
17. Translate a work breakdown structure into a logic flow chart complete with milestones.	5	4	3	2	1

Project Management Inventory

Remember 1 = Expert Knowledge, 2 = Extensive Knowledge, 3 = Good Knowledge, 4 = Some Knowledge and 5 = No or Slight Knowledge

18. Use the project flow chart and the project task-event resource calendar to adjust those task-events which are time flexible so as to fully utilize the resources and to accomplish a somewhat uniform rate of resource utilization. 5 4 3 2 1

19. Establish criteria for examining cost/benefits of rental or purchase of equipment. 5 4 3 2 1

20. Determine cost of materials and supplies. 5 4 3 2 1

21. Estimate the resources (facilities, skills, equipment, etc.) necessary for the accomplishment of each task. 5 4 3 2 1

22. Investigate and determine costs associated with needed equipment. 5 4 3 2 1

23. Specify for each project task the conditions under which the performance is measured and the acceptability standard for the performance. 5 4 3 2 1

24. Establish a set of nominal codes for the resource items required for the project. 5 4 3 2 1

25. Create a work breakdown structure document, including a chart, which contains the goal, missions, and tasks arranged in hierarchial order. 5 4 3 2 1

26. Initiate and control data collection on work activity by reports, observations, discussion, staff meetings and literature. 5 4 3 2 1

27. Release facilities and equipment to parent organization or to other projects as directed. 5 4 3 2 1

28. Estimate the time required for task accomplishment. 5 4 3 2 1

29. Check flow chart for complete and orderly logic by tracing an example sequence of activities through the flow chart. 5 4 3 2 1

30. Determine the high and low counts (or requirements) for each resource item at various times across the calendar. 5 4 3 2 1

31. Make up project task-event calendar using project start date, logic flow chart, task accomplishment times, and total project time. 5 4 3 2 1

Project Management Inventory

TASK	RATING				
32. Obtain information on salary/wage/fee rates for the required skilled persons and costs of fringe benefits.	5	4	3	2	1
33. Designate from the flow chart those events (start or completion of an activity) which are milestones.	5	4	3	2	1
34. Develop several alternative courses of action for problem solution involving the trade off of performance, schedule and cost.	5	4	3	2	1
35. Cost out fringe benefits, personnel travel expense, and other expenses.	5	4	3	2	1
36. Create status and action reports listing the information, alternatives, and decision to distribute to the contracting body for information and possible approval and to the project personnel to inform them of the changes made to better achieve the overall goal.	5	4	3	2	1
37. Determine costs associated with required facilities.	5	4	3	2	1
38. Prepare necessary and required final reports for the project.	5	4	3	2	1
39. Estimate a "best" time for task accomplishment for each task in a flow chart by applying an effective resource application rate to required times for these tasks.	5	4	3	2	1
40. Execute the project gear-up plan.	5	4	3	2	1
41. Delineate responsibility for personnel.	5	4	3	2	1
42. Investigate and consider the local school system for availability of personnel skills required.	5	4	3	2	1
43. Estimate total project (goal) time.	5	4	3	2	1
44. Determine the lead time required for the acquisition of each type of resource or skill.	5	4	3	2	1
45. Determine the extent to which several types of skills can be combined into a single skilled person.	5	4	3	2	1

Project Management Inventory

TASK	RATING				
46. Combine the task resource requirements with the project task-event calendar using the nominal codes.	5	4	3	2	1
47. Execute planned action of a decision or selected alternative.	5	4	3	2	1
48. Fit project organization into existing LEA structure.	5	4	3	2	1
49. Operate within various federal, state, and local guidelines concerning expenditures and budgets.	5	4	3	2	1
50. Re-arrange the sequence and flow logic of the tasks so that the work accomplishes the overall goal.	5	4	3	2	1
51. Create an expenditure schedule that plans for distribution of resources over the total project.	5	4	3	2	1
52. Work with functional organization units in arranging for disposition of project personnel by seeking other assignments within organization.	5	4	3	2	1
53. Identify and establish a broad project goal.	5	4	3	2	1
54. Purge project files of unnecessary materials and items.	5	4	3	2	1
55. Organize the staff into a control and communication hierarchy.	5	4	3	2	1
56. Cost out the salaries, wages, and fees for personnel resource requirements for the project.	5	4	3	2	1
57. Compare the actual performance, work schedule, and expenditure rate to project plan.	5	4	3	2	1
58. Determine indirect costs for the project (by either applying a percent to total personnel costs or by specifying an amount).	5	4	3	2	1
59. Draw a pictorial sequence (flow chart) which logically connects the tasks (activities) and events (identified as a point in time when something starts or is completed).	5	4	3	2	1

Lesson 1--Introduction to Project Management

Exercise C--Summary Sheet

Directions: Transfer the score you have circled for each item in these phase categories. Then total each phase category and transfer your totals to the next page.

Planning A

Item	Score
11	
17	
23	
25	
29	
33	
50	
53	
59	
Total	

Planning B

Item	Score
1	
2	
8	
9	
14	
18	
19	
20	
21	
22	
24	
28	
30	
31	
32	
35	
37	
39	
42	
43	
45	
46	
49	
51	
56	
58	
Total	

Preparation

Item	Score
3	
4	
7	
16	
40	
41	
44	
48	
55	
Total	

Control

Item	Score
6	
10	
12	
13	
15	
26	
34	
36	
47	
57	
Total	

Termination

Item	Score
5	
27	
38	
52	
54	
Total	

Directions: After transferring your totals to the next page, tear out this sheet. Place this sheet into the special envelope provided along with the Lesson Quality Control Form which you will complete later. Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103

Lesson 1--Introduction to Project Management

Excercise C--Profile

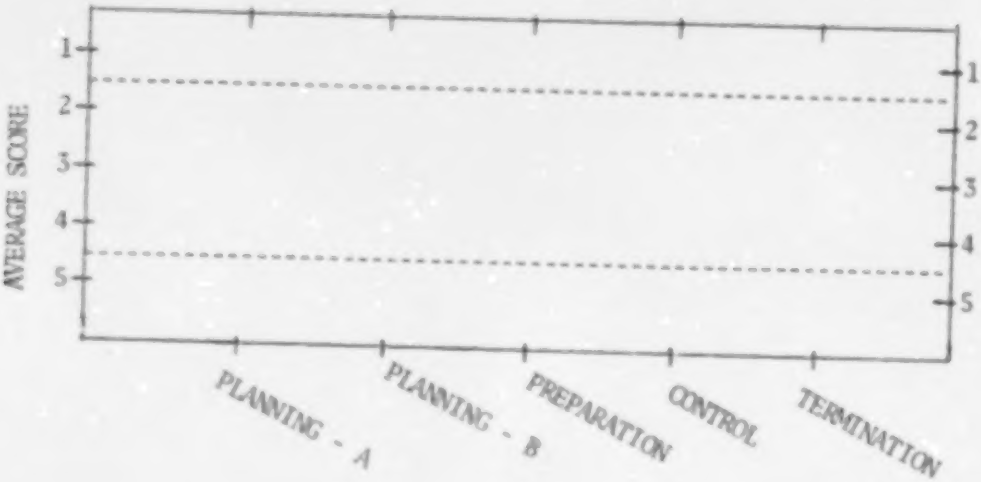
My Profile for Project Management

Directions: Prepare a profile of your project management skills by transferring the totals from the previous page and completing the calculations. Divide your totals by the number indicated.

Planning A Total ______ divided by 9 = ______ average score
Planning B Total ______ divided by 26= ______ average score
Preparation Total ______ divided by 9 = ______ average score
Control Total ______ divided by 10= ______ average score
Termination Total ______ divided by 5 = ______ average score

Directions: Plot your average score on the profile for each phase and connect the points. The dotted line across the profile indicates regions of strength and weakness and shows where time might be spent in study and practice.

My Profile



Turn the page and proceed.

Profile Interpretation

The profile line connecting your average scores indicates regions for strengths and weaknesses. The higher the line on the graph the better your capability in project management.

The profile line peaking above the upper dotted line (less than 1.5) indicates that you have a fairly good grasp of the knowledge and skills needed to perform the tasks related to that particular phase of project management. If this occurs for you, you may wish not to study the lessons associated with those phases and can skip them. It is suggested that you read the lesson abstracts and outlines for lessons in those phases which you intend to skip.

If your profile line does not cut the upper dotted line then you have a lower mastery of the knowledge and skills of project management and should follow the regular sequence of lessons starting with lesson 2 and proceeding through lesson 12 in order. If your profile line falls below the lower line (more than 4.5) then you should concentrate more diligently on acquiring the knowledge and skills associated with the lessons for those phases of project management.

Lesson Correspondence

Planning A tasks correspond to Lesson 2--Project Definition, Lesson 3--Work flow and Lesson 4--Time Estimation.

Planning B tasks correspond to Lesson 5--Schedule and Resource Allocation and Lesson 6--Costs and Budgets.

Preparation tasks correspond to Lesson 7--Project Start-Up and Lesson 8--Developing a Project Information System.

Control tasks correspond to Lesson 9--Problem Identification through Management Reports, Lesson 10--Problem Solving through Management Action and Lesson 11--Division Implementation.

Termination tasks correspond to Lesson 12--Project Termination

Directions:
The directions on the next page should aid you in obtaining additional information on the concepts contained in this exercise. Turn the page and proceed.

Lesson 1--Introduction to Project Management

Directions and Choices Following the Practice Exercises

Based upon the self-evaluation of your performance on exercise A and B you have either:

A. acceptably satisfied the objectives of the introduction to project management, and should now turn to the post-test found on page 1.29.

An additional example on the basic concept of project management is found on pages 1.31 References for additional reading are listed on page 1.33.

B. not satisfied the objectives. If so, you should select one or more of the following courses of action:

1. study the additional example on page 1.31, then rework exercise A and B starting on page 1.15.
2. read chapters 1,2,3 and 4 of Educational Project Management by Desmond L. Cook and then rework exercise A and B starting on page 1.15.
3. view the slide-tape presentation; instructions are on page 1.7 . After the presentation rework exercise A and B starting on page 1.15.
4. read the lesson narrative beginning on page 1.8 , and then rework exercise A and B starting on page 1. 15.
5. rework exercise A and B starting on page 1.15.

Lesson 1--Introduction to Project Management

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated____________.

1. What would be an example of an "educational project" in a school district?

   A. Established curriculum program
   B. Cafeteria operation
   C. Driver education summer program
   D. Instructional materials development activity

2. While there are many definitions of management,what is perhaps the most general one?

   A. Decision-making related to allocating resources and directing the actions of people toward the attainment of desired ends by optimal means
   B. Administration of policies and procedures established by higher authority
   C. Securing personnel and keeping cost records
   D. Arranging people in patterns of relationships relative to authority roles

3. What is probably the most important management factor in the successful completion of a project?

   A. Private funding
   B. Cooperation from other school offices and departments
   C. A large research staff
   D. Project manager competency

4. Do any time, cost and performance trade-off's occur in the development of the end product of a project?

   A. Yes, but only time and performance
   B. Yes, all three often occur
   C. No, they are only of concern in the project planning phase
   D. No, they can be overlooked in solving project problems

5. What are the four principal phases in the life span of a project?

   A. Planning, preparing, controlling and terminating
   B. Planning, controlling, terminating and evaluating
   C. Planning, management, evaluation and termination
   D. Planning, organizing, directing and controlling

6. What are generally considered as the basic functions of management?

   A. Planning, preparing, controlling and terminating
   B. Planning, organizing, directing and controlling
   C. Cost allocation, directing, scheduling and terminating
   D. Planning, scheduling, preparing and controlling

7. Project management can be discussed at what level in a school district?

   A. Only at a school system level
   B. Only at a single project level
   C. Both at a school system level and a single project level
   D. Only at a departmental level

8. What phase of the project life cycle usually involves the detection and correction of deviations in order to insure successful accomplishment of the project goal?

   A. Planning
   B. Preparation
   C. Evaluation
   D. Operational control

9. The termination phase refers to closing out the project at what point?

   A. End of school year
   B. The project goals are achieved
   C. Project members take new positions
   D. Evaluation report is completed

10. What is considered as the primary responsibility of a project manager?

   A. Only to prepare the project report
   B. To make decisions regarding implementation of all tasks
   C. To prepare a project manual
   D. To accomplish project goals within time, cost and performance specifications

11. What major activities comprise the planning phase of the project life cycle?

    A. Specifying goals and objectives, determining equipment, personnel, materials, facilities, and information needs
    B. Specifying goals and objectives, determining flow of tasks, estimating time schedules, determining costs, manpower needs and preparing a budget
    C. Doing needs assessment, writing proposal and approving the budget
    D. Securing personnel, facilities, equipment and space

Indicate whether the statements listed below are true or false by writing a T or F on the line.

12. _____Specifying tasks and workflow in a project is the duty of the project staff.

13. _____A project has a finite life span

14. _____The role of a project manager involves decisions and actions which make him the planner and integrator of project activities.

15. _____The project preparation phase involves the activities of estimating time schedules, costs and manpower needs.

Turn the page and check your answers

Lesson 1--Introduction to Project Management

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to lesson 1 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the basic concepts of projects and project management and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 1.7 and proceeding. After the presentation turn to the Lesson Quality Control Form on page 1.34.
2. Read the lesson narrative beginning on page 1.8 and then turn to the Lesson Quality Control Form on page 1.34.
3. Read chapter 1,2,3,4 of Educational Project Management by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 1.34.
4. Study the additional examples beginning on page 1.31 and then turn to the Lesson Quality Control Form on page 1.34.
5. Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 1.34.

Directions: If you have answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the project definition process and should now turn to the quality control form on page 1. 34 An additional example is found on page 1. 31. References for additional reading are listed on page 1.33.

Multiple Choice

1. D
2. A
3. D
4. B
5. A
6. B
7. C
8. D
9. B
10. D
11. B

True/False

12. F
13. T
14. T
15. F

Lesson 1--Introduction to Project Management

Additional Example

Directions: This example is an attempt to show the relationship of the Project Lifespan Phases and Project Management Missions, the Management Functions, the Duties of Project Managers, and the Tasks that Project Managers perform. Identification of the tasks performed by the project manager for each phase can be made by locating the tasks listed on the Project Management Inventory. The numbers listed correspond to the item number on the inventory.

Project Lifespan Phases and Corresponding Project Management Missions	Management Function Involved	Project Manager Duties in each Phase	Project Manager Tasks listed on the Project Management Inventory	
			Item	Item
Planning	Planning	a. Establishing goals b. Specifying tasks and work flow c. Time scheduling d. Resource allocating e. Budget development	1 2 8 9 11 14 17 18 19 20 21 22 23 24 25 28 29 30	31 32 33 35 37 39 42 43 45 46 49 50 51 53 56 58 59
Preparation	Organizing Planning	a. Gearing-up the operation b. Delineating responsibilities for the staff c. Establishing policies d. Developing a Management information system	3 4 7 16 40 41 44 48 55	

Project Lifespan Phases and Corresponding Project Management Missions	Management Function Involved	Project Manager Duties in each Phase	Project Manager Tasks listed on the Project Management Inventory	
			Item	Item
Control	Controlling Directing Planning Organizing	a. Creating a reporting system b. Evaluating and reviewing project activity c. Controlling project activity d. Creating a productive project atmosphere e. Directing others f. Reporting to higher management	6 10 12 13 15 26 34 36 47 56	
Termination	Directing Planning Controlling	a. Specifying tasks b. Controlling project activity c. Directing others d. Reporting to higher management	5 27 38 52 54	

Lesson 1--Introduction to Project Management

Reading References

Additional knowledge about projects and the basic concepts of project management can be obtained by reading from the references cited below.

Archibald, R.D., and R.T. Villoria Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, pages 1 & 2.

Baumgartner, J.S. Project Management. Homewood, Illinois: Richard Irwin, Inc., 1963, Introduction and Chapter 1.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 1,2, and 3.

Woodgate, H.S. Planning by Network. London, England: Business Publications, Ltd., 1964, Chapter 16.

Lesson 1--Introduction to Project Management

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 1--Introduction to Project Management

Termination Instructions

Upon completion of the Lesson Quality Control Form you are to:

Tear out and staple the pages of the Lesson Quality Control Form
Place the form in the special envelope provided along with the Project Management Inventory Summary Sheet.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on an introduction to project management is now completed. Lesson 2 entitled "project definition" is the next lesson in the sequence. You are advised to locate the lesson booklet and read the introductory pages if your profile on the Project Management Inventory so indicates. If you choose not to follow the regular sequence then determine which lesson you should work next and locate that lesson's booklet and read the introductory pages.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 2 -- Project Definition

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 2--Project Definition

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson 2.1
Overview and objectives. 2.2
Pretest. 2.3
Lesson abstract and content outline. 2.5
Lesson text. 2.8
Exercises on project definition. 2.14
Post-test. 2.20
Additional examples. 2.22
Reading references 2.26
Lesson Quality Control Form. 2.27

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 2--Project Definition."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 2--Project Definition."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 11 minutes, the exercise takes approximately 30 minutes. About one hour is needed to complete the entire lesson.

Lesson 2--Project Definition

Overview and Objectives

OVERVIEW

In the previous lesson the general concept of project management was introduced, several terms were defined, and the overall sequence of the project management topics was explained. Terms important to project management are also defined in the glossary accompanying this module.

This lesson is concerned with defining the tasks of a project. Subsequent lessons explain how to place these tasks in proper sequence, estimate the time and resources needed for their completion, and determine the budget items required.

OBJECTIVES

The student in completing this lesson should be able to create a work breakdown chart showing goal, missions, and tasks arranged in hierarchical order when given a project description in narrative form. The specific objectives of the lesson are as follows:

1. The student should be able to state the broad overall goal of a project when given a description of a problem, a setting, and guidelines.

2. The student should be able to create a breakdown of a given goal statement into several sub-goal (mission) statements.

3. The student should be able to create a breakdown of several mission statements into several sub-mission (task) statements.

Read the directions for the pretest on the following page.

Lesson 2--Project Definition

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C, or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated __________.

1. What categories of decisions are of chief concern in project definition?

   A. Goals and objectives of the project
   B. Procedures for conducting project
   C. Relationships to other school offices and programs
   D. Target audience

2. Project definition is considered to be the most crucial step in what phase of the life cycle of a project?

   A. Operational control
   B. Planning
   C. Evaluation
   D. Termination

3. What types or forms of logic is used in developing the project objectives?

   A. Inductive
   B. Deductive
   C. Both inductive and deductive
   D. Neither inductive or deductive

4. What is the main function or purpose of a work breakdown structure?

   A. Summarize cost and schedule data
   B. Define precisely the essential tasks for accomplishment of the overall project goal
   C. Relate various objectives to the work schedule
   D. Summarize evaluation data

5. What is the lowest level of the work breakdown structure?

   A. Event sub-division
   B. Task or activity
   C. Work package
   D. Network

6. Why is it important to carefully prepare the project definition?

   A. It is used as a basis for funding decision
   B. It is the foundation upon which all subsequent project effort is built
   C. It is the primary basis for staff assignments
   D. It is the foundation upon which important documents are prepared

7. The project definition process is analogus to what activity in systems thinking?

   A. Analysis
   B. Management
   C. Synthesis
   D. Engineering

8. What is the chief product or output of the project definition process?

   A. Work breakdown structure
   B Network diagram
   C. Time-table of events
   D. Personnel assignments

9. Who should be involved in the development of the project definition?

   A. All project staff
   B. The project management and outside consultants
   C. Only project manager
   D. The project management and selected project staff

Indicate whether the statements listed below are true or false by writing a T or F on the line.

10. ______The concept of goal incorporates the idea of the end product of the effort.

11. ______A work package is a task or set of sub-tasks whose accomplishment will contribute to the finished product identified by the project goal.

12. ______A work package should be associated with two or three persons.

13. _____The task or sub-task is the basic unit of the project goal.

14. _____The first sub-division of the goal is often termed task.

15. _____The accomplishment of all the lower level tasks results in the attainment of the project goal(s).

Turn the page and check your answers.

Lesson 2--Project Definition

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 2 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the project definition process and should read the lesson abstract and content outline on pages 2.5 and 2.6. Then begin the tape-slide presentation by turning to the instructions on page 2.7.

If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the project definition process and should read the lesson abstract and content outline on page 2.5. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 2.14. If you do desire to view the tape-slide presentation, turn to the instructions on page 2.7

Multiple Choice

1. A
2. B
3. C
4. B
5. C
6. B
7. A
8. A
9. D

True/False

10. T
11. T
12. F
13. T
14. F
15. T

Lesson 2--Project Definition

Lesson Abstract and Content Outline

ABSTRACT

Project definition is the activity concerned with describing a project. This activity involves specifying a project boundary and identifying these features of an educational problem area of concern which are to be dealt with by the project. The description includes all the statements of objectives which are intrinsic to the activity being developed and explains the broad to specific nature of the various statements.

CONTENT OUTLINE

A. Project definition is the effort involved with describing a project. This description includes:

   1. the general nature of a problem area,

   2. the setting for the project,

   3. a needs assessment,

   4. an itemization of constraints, and

   5. the list of objectives.

B. The second activity in defining a project is a hierarchical ordering of the project objectives. These objectives are listed in order from the most general to the most specific.

   1. A goal is the broadest statement about the project.

   2. Mission statements are the first level set of objective statements which together describe the overall goal.

   3. Tasks are a second level set of objective statements. A set of tasks completely describes a mission.

   4. Subtasks are specific statements which subdivide a given task.

C. The process for developing goal-mission-task hierarchy can be of various types:

   1. A deductive process of developing the hierarchy is one where statement specification begins with the project goal statement.

2. An inductive process of developing the hierarchy is one where statement specification begins with a set of specific statements and builds.

3. Often in practice a combination inductive and deductive process is used.

D. Various procedures are used in defining a project.

1. The cooperative effort of three to six people is best.

2. Careful attention to the definition effort is important as the definition is a foundation for all subsequent project work.

3. Proper definition of the project permits a correct delineation of necessary tasks and subsequently allows for efficiency during project operations.

4. There is a need for precise task descriptions which specify the exact nature of work and the level of performance required for the task.

5. Project definition procedures are similar to systems analysis techniques.

    a. The boundary includes essential project elements.

    b. Subsystems and components are identified.

    c. Systems can be used for analogies.

Lesson 2--Project Definition

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the slide marked Module 2--Basic Principles and Techniques of Project Management, Lesson 2--Project Definition.*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 2--Project Definition

Lesson Text

Introduction

This lesson is the first of five lessons dealing with the project planning phase of the project management process. The project planning phase includes the following activities: (1) defining the project in terms of its goals and specifying the work to be done, (2) describing the flow of the work or tasks, (3) estimating time, (4) allocating resources, and (5) preparing a budget.

The activity concerned with the setting of goals and the specification of the work to be done on the project is referred to as project definition. The project definition activity is the first step in project planning and forms the foundation upon which subsequent steps are based. The overall success of a project is to a large extent determined by the care given to defining the nature of project under consideration. Therefore, this activity is a critical step in project planning.

Project definition is a process of expressing in written form the project goal or end product, the missions (major tasks) which will be undertaken to achieve the overall goal, and the tasks necessary to accomplish the missions. The placing of tasks missions and goals into a hierarchy (goal-mission-task) helps to order the work that is considered essential for the successful completion of the project. The product of the project definition phase is referred to as the work breakdown structure (WBS).

Work Breakdown Structure (WBS)

The work breakdown structure can be developed by proceeding deductively from the overall objective or project goal statement. This process involves writing additional objectives or tasks that are more specific or detailed and smaller in scope. The hierarchy can also be developed inductively by listing a relatively large number of specific objectives or tasks subordinate to the overall project goal and then grouping related objectives and tasks into larger and larger aggregates, until the overall project goal is reached. Another method involves using both the deductive and inductive approaches. This is accomplished by starting with both an overall project goal and a large list of specific objectives or tasks and shifting between the two approaches until the entire hierarchy is completed.

The different levels in the hierarchy of project objectives and tasks represent different levels of specificity in describing the project. The overall project goal is at the top or first level of the hierarchy. The first subdivision of this goal is into what are often termed missions. Each mission at this second level in the hierarchy represents the accomplishment of a set of interrelated and interdependent objectives or tasks. Objectives found at the third level are usually called tasks. A task may be a segment of work assigned to a single person or it may require the efforts of several persons. If the task is too large, it can be further sub-divided into two or more smaller segments called sub-tasks. The lowest level of this hierarchy or goal-mission-task breakdown should include the essential tasks for the accomplishment of the overall project goal. An example of a WBS is presented in Figure #1.

A WBS is analogous to the functional delineations used for the management of a school system. For example, consider the school system organizational chart presented in Figure #2. The scope of work, authority, and responsibility is reduced as one moves down the chart. The accomplishment of all tasks at each level presumably results in the attainment of all work at the next higher level.

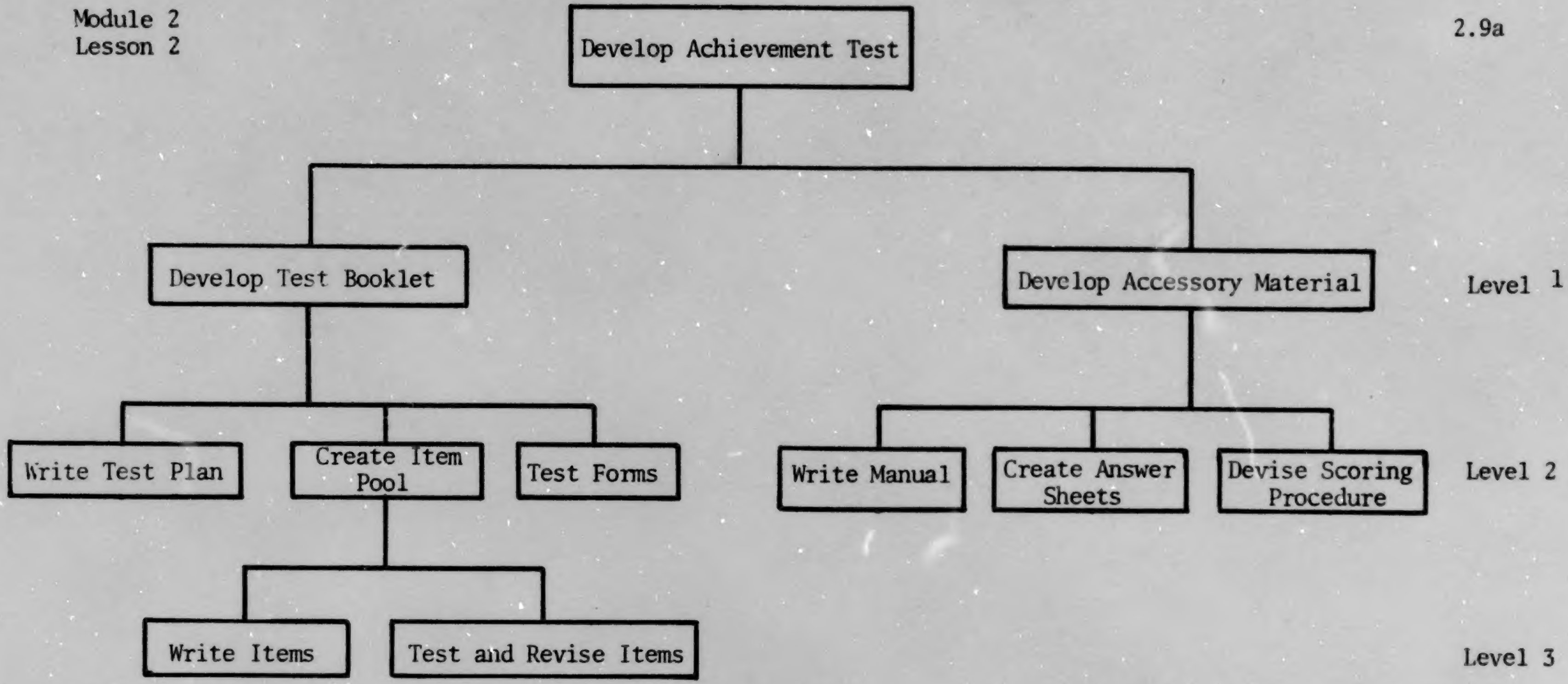

Develop Achievement Test
Develop Test Booklet
Develop Accessory Material
Level 1
Write Test Plan
Create Item Pool
Test Forms
Write Manual
Create Answer Sheets
Devise Scoring Procedure
Level 2
Write Items
Test and Revise Items
Level 3

Figure #1--Work Breakdown Structure for Developing an Achievement Test

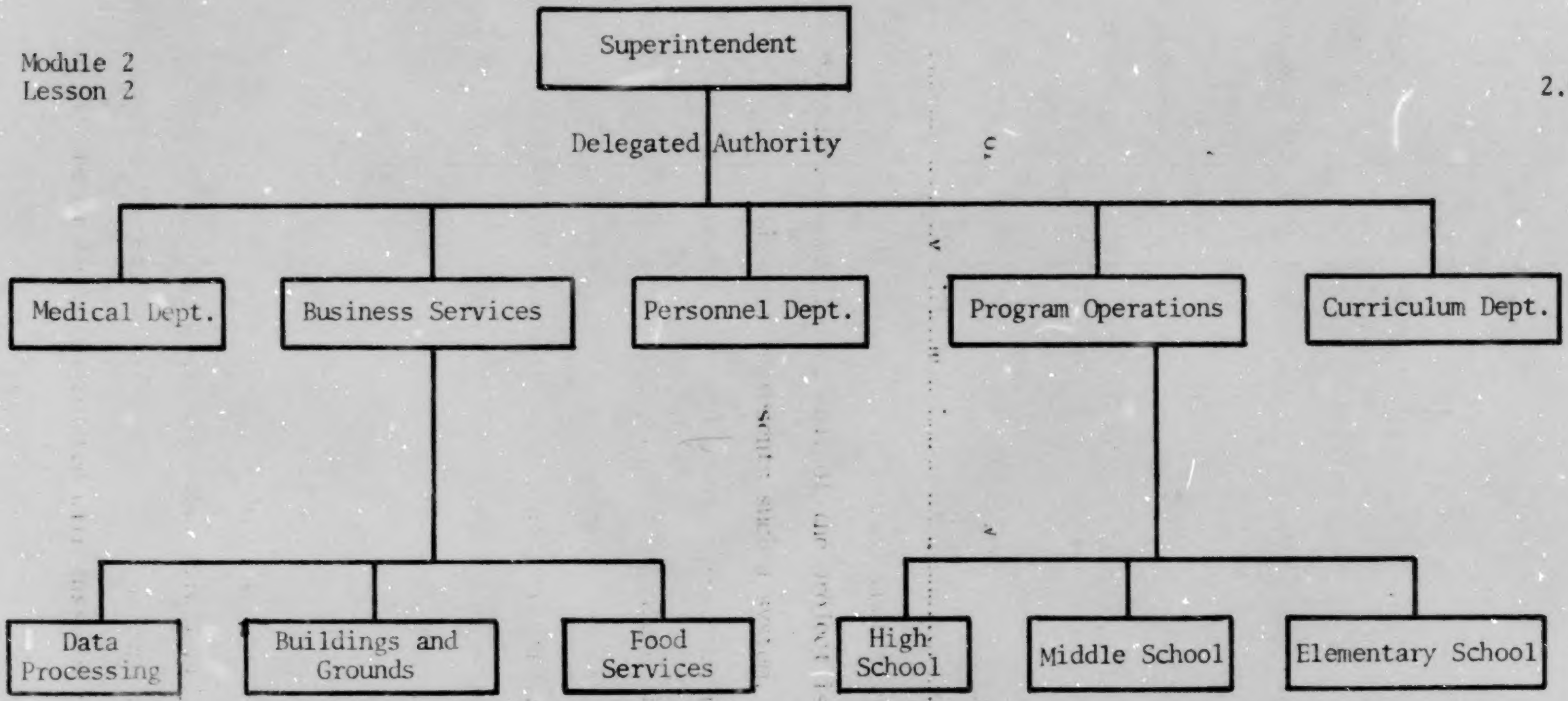

Superintendent
Delegated Authority
Medical Dept.
Business Services
Personnel Dept.
Program Operations
Curriculum Dept.
Data Processing
Buildings and Grounds
Food Services
High School
Middle School
Elementary School

Figure #2--Typical School District Functional Organization Chart

Project Definition Process

The process and procedures used in the definition of a project are similar to the techniques used in basic outlining procedures or in the analysis procedures used in a systems approach. System analysis is concerned with dividing an overall system into subsystems and each subsystem into its subordinate subsystems. This analysis or breakdown is continued until a level of subsystem is reached which has a simple component with a relatively simple purpose.

For example, the analogy between system analysis and project definition can be seen by viewing a house as a shelter system with floors, walls and a roof as its boundaries. The overall goal of a project is analogous to the overall system. If the goal of the project is to have a warm dry place to sleep, a good house represents such a system. The missions of the project are analogous to first-order subsystems. In this analogy the missions are to have heat, dry space, and sleeping area. The tasks of the project are analogous to second-level subsystems. Such tasks include having a furnace, heat distribution system, temperature control, etc. The sub-tasks of the project are analogous to third-order subsystems. In the analogy, the subtasks are to have a furnace with gas or oil input lines, ignition, a combustion box, and safety controls. The various furnace components are analogous to these sub-tasks of the project.

As illustrated by this analogy, the project definition process consists of analyzing or breaking down the overall project goal into smaller or more specific objectives and tasks. This process continues until a work breakdown structure has been constructed with tasks or sub-tasks appearing at the lowest level in the hierarchy. These tasks or sub-tasks can usually be prepared by a single person with a limited amount of resources.

The definition of a project should be accomplished through the cooperative effort of some of the important individuals who will be involved with the project. Commitment to the goal and objectives of the project by those persons responsible for major work efforts will certainly enhance the likelihood of positive achievement during the operation of the project. A group of from three to six is of sufficient size to generate alternative ideas about the goal, mission, and task statements, while not being so large a group that ultimate consensus becomes extremely difficult to attain. The project definition, as developed by this small project planning group, can be submitted to the entire project staff for additional comments and suggestions.

The careful definition of the project is important because it is the foundation upon which all subsequent project effort will be built and upon which the project will be evaluated. In addition, the effort expended in defining the project will be rewarded in later phases of the project by the reduction of the likelihood of performing unnecessary tasks, duplicating activities, or performing tasks incorrectly.

Work Packages

Often several tasks or sub-tasks in a WBS are grouped together for the purpose of identifying pieces of work that will serve as the basic units of later project planning and control activities. These units, called work packages, each represent a specific job with an identifiable output or product that contributes to the accomplishment of the overall project goal. They are the lowest level of work, along with schedules and costs that will be monitored and controlled by the project director. The hierarchical combination of all work packages plus the overall management activity equals the total work effort required to accomplish the project goal.

In specifying work packages an effort should be made to insure that they are clearly defined, represent a manageable amount of work for a few persons or small organizational unit, can be completed in a relatively short period of time and have definite start and completion points. It is especially important that work packages be defined so that they are meaningful to the people who will perform the work and will facilitate the development of specifications for the work that is to be done. A helpful technique in the development of work specifications is to determine the inputs needed to do the work, analyze the processes involved in doing the work and identify the required outputs of the completed work package. Work specifications should include a statement of standards, i.e., the quality or degree of completeness required. The work specification or set of standards can then be used as a measure of success, and it is often referred to as a performance criterion.

Work packages usually appear at the lowest level in a WBS. Work packages or task descriptions usually include an action verb and an object noun. (e.g., revise reading program, evaluate revised reading program, etc.). Since many of the crucial project activities appear at the task or sub-task level in a work breakdown structure, it is imperative that each task be well delineated. On the other hand, the task description should not be so extensive that it produces overly simplified steps.

Summary

Project definition is performed by a small group of project staff persons who will, consequently, be more likely to support the project. The staff precisely defines the nature of the final product and includes all activities which are required to achieve the project goal. The goal statement, and related mission and task statements, are precisely developed, so that the goal-mission-task hierarchy is clearly established. The tasks are delineated in sufficient detail so that information about the work effort is clear, concise, and explicit.

Read the general situation for Exercises A and B on P. 2.14

Lesson 2--Project Definition

General Situation for Exercises A and B

The Superintendent of Metropolitan School District has made a tentative decision to hold a workshop in conjunction with a Title III operation for the purpose of instructing classroom teachers on how to write behavioral objectives. He has also made certain initial decisions with regard to this workshop. The workshop will be held for three days in a motel about 30 miles from town and personnel will stay there at all times. A pretest and post-test will be included as part of the workshop. Lesson materials and exercises will be made available for participants. The teacher participants will represent each building with a total of thirty teachers to be present. The planning staff for the workshop will be drawn from the Office of Research and Evaluation.

You have been assigned as Project Manager for this effort. The Superintendent has requested that you submit to him within the next few days a plan which will reflect the work that has to be done, the schedule to be followed, the resources needed, and a budget covering the direct costs of the project. He will then make his final decision with regard to the workshop.

Turn the page for Exercise A.

Lesson 2--Project Definition

Exercise A

After studying the situation described on the previous page, you are to establish the objective hierarchy. Answer the questions appearing below. It is suggested that you allow approximately 15 minutes for this exercise. When completed turn the page.

1. Write in the space below what you feel is the major overall goal (mission, function, objectives, and/or purpose) of the project.

2. Write the several major subgoals (missions, functions, and/or purposes) which have to be accomplished in order to achieve the goal you state above.

3. Identify those several minor tasks which have to be accomplished in order to achieve each of the major missions you listed above. If deemed necessary, you may subdivide some of these tasks in order to completely define the project activity.

Lesson 2--Project Definition

Exercise A--Solution

A suggested objective hierarchy for the practice exercise is given below. This hierarchy is not to be considered the solution, but rather it is an acceptable one. Check your work against this suggested solution. Feel free to use some of these objectives in working Exercise B. When finished turn the page.

---

1. Write in the space below what you feel is the major overall goal (mission, function, objectives, and/or purpose of the project.

Answer: The goal of the project is to conduct a workshop for instructing selected teachers in the procedures of writing behavioral objectives.

---

2. Write the major subgoals (missions, functions, and/ or purposes) which have to be accomplished in order to achieve the goal you state above.

Answer: The major subgoals or missions of the project are:

A. The projector director is to select or assist in selecting the workshop staff and the participants.

B. The director and staff are to develop the workshop program.

C. The director and staff are to make arrangements for physical needs of the workshop.

---

3. Identify those several minor tasks which have to be accomplished in order to achieve each of the major missions you listed above. If deemed necessary, you may subdivide some of these tasks in order to completely define the project activity.

Answer: The sub-missions or tasks of the project are:

A_1. Arrange for and select the instructional and administrative staff.

A_2. Arrange for and select the teacher participants.

B_1. Develop instructional strategy in terms of writing instructional objectives, writing content outlines, and developing instructional media materials.

B_2. Develop the workshop program schedule and have session agenda printed.

B_3. Develop evaluation plan for the instructional program.

C_{1-4}. Make the arrangements for the workshop in terms of selecting and arranging for hotel accommodations, arranging for transportation, arranging for the workshop session space, and arranging for audio-visual equipment and facilities.

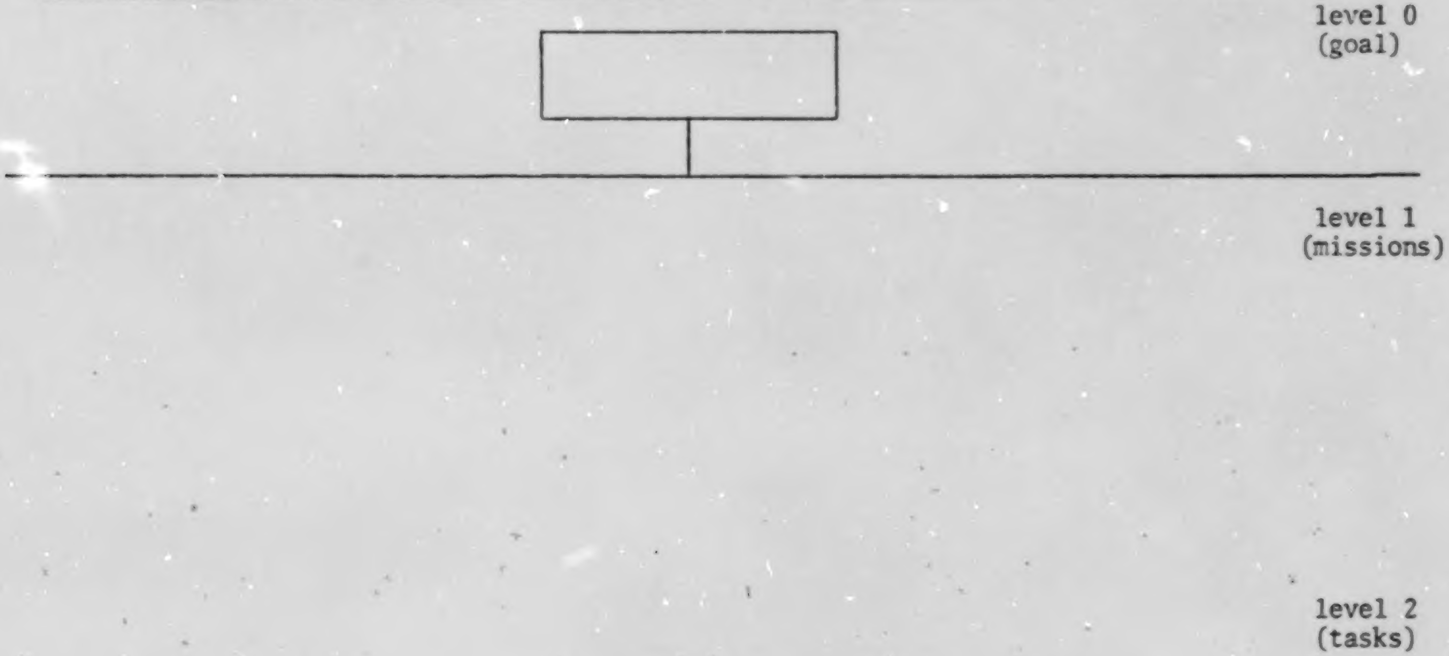
D_1. Conduct a follow-up study to get information on the changed behavior of participants.

D_2. Write the workshop evaluation and summary report.

Lesson 2--Project Definition

Exercise B

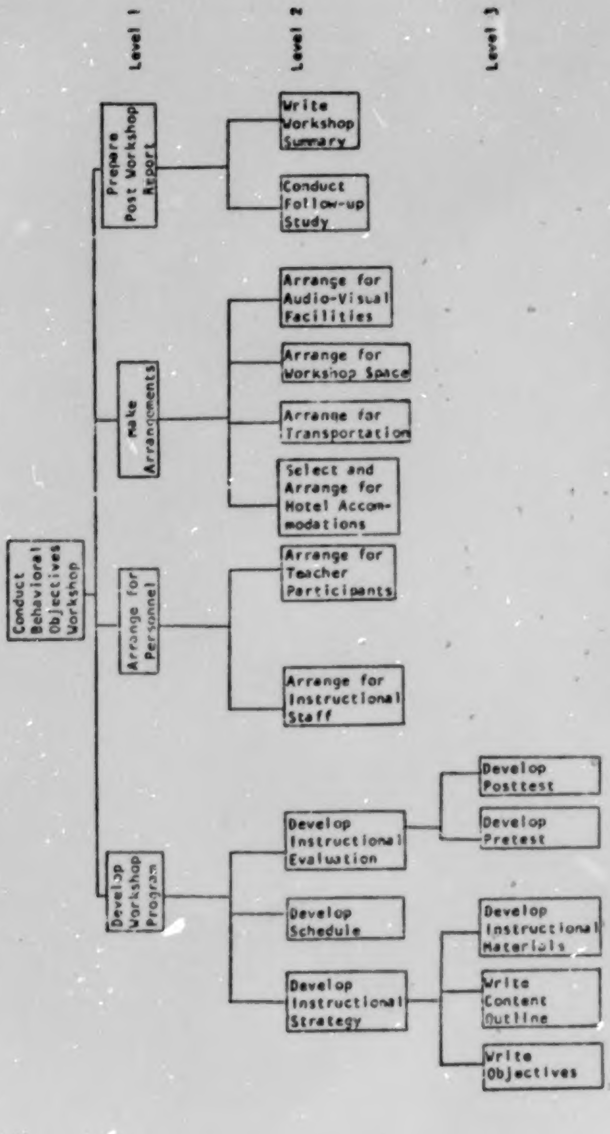
Using the results of the previous exercise on establishing the goal-mission-task hierarchy, you are to develop the work breakdown structure by drawing a graphical representation of the project definition. Use as many levels as needed in order to show all of the work that has to be done in order to accomplish the project. It is suggested that you allow approximately ten minutes. When finished, turn the page.



Lesson 2--Project Definition

Exercise B--Solution

Directions: A suggested work breakdown chart for the practice exercise is given below. This chart is not to be considered the solution, but rather it is an acceptable one. Check your work against this suggested solution and judge it satisfactory or unsatisfactory. A comparable chart would have approximately the same number of goal, mission, and task statements at each level. Also, it would be arranged so that the accomplishment of each group of tasks results in the accomplishment of a mission and the accomplishment of each group of missions results in the accomplishment of a goal.


Conduct Behavioral Objectives Workshop
Level 1
Develop Workshop Program
Arrange for Personnel
Make Arrangements
Prepare Post Workshop Report
Level 2
Develop Instructional Strategy
Develop Schedule
Develop Instructional Evaluation
Arrange for Instructional Staff
Arrange for Teacher Participants
Select and Arrange for Hotel Accommodations
Arrange for Transportation
Arrange for Workshop Space
Arrange for Audio-Visual Facilities
Conduct Follow-up Study
Write Workshop Summary
Level 3
Write Objectives
Write Content Outline
Develop Instructional Materials
Develop Pretest
Develop Posttest

NOTE: Boxes at Levels 2 and 3 are placed vertically here as a space-saving device.

Lesson 2--Project Definition

Directions and Choices Following the Practice Exercise

Based upon the self-evaluation of your performance on the exercise, you have either:

A. *acceptably satisfied the objective of creating a work breakdown chart after having been given a narrative description of a project, and should now turn to the post-test found on page 2.20.*

   Additional examples on creating work breakdown charts are found beginning on page 2.22. References for additional reading are listed on page 2.26.

B. *not satisfied the objective, and should select one or more of the following courses of action.*

   1. *If your chart was correct except for the lower task level, then either:*

      a. *Study the additional examples beginning on page 2.22 and then rework exercise B on page 2.17.*

      b. *Read Chapter Five of Educational Project Management by Desmond L. Cook and then rework exercise B on page 2.17.*

      c. *Rework exercise B on page 2.17.*

   2. *If your chart was not correct at the upper goal or mission levels, then either:*

      a. *View the slide-tape presentation; instructions are on page 2.7. After the presentation, rework exercise B on page 2.17.*

      b. *Read the lesson narrative beginning on page 2.8 and then rework exercise B on page 2.17.*

Lesson 2--Project Definition

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated __________.

1. What types or forms of logic is used in developing the project objectives?

   A. Inductive
   B. Deductive
   C. Both inductive and deductive
   D. Neither inductive or deductive

2. What is the main function or purpose of a work breakdown structure?

   A. Summarize cost and schedule data
   B. Define precisely the essential tasks for accomplishment of the overall project goal
   C. Relate various objectives to the work schedule
   D. Summarize evaluation data

3. What is the lowest level of the work breakdown structure?

   A. Event sub-division
   B. Task or activity
   C. Work package
   D. Network

4. Project definition is considered to be the most crucial step in what phase of the life cycle of a project?

   A. Operational control
   B. Planning
   C. Evaluation
   D. Termination

5. What categories of decisions are of chief concern in project definition?

   A. Goals and objectives of the project
   B. Procedures for conducting project
   C. Relationships to other school offices and programs
   D. Target audience

6. What is the chief product or output of the project definition process?

   A. Work breakdown structure
   B. Network diagram
   C. Timetable of events
   D. Personnel assignments

7. Who should be involved in the development of the project definition?

   A. All project staff
   B. The project management and outside consultants
   C. Only project manager
   D. The project management and selected project staff

8. The project definition process is analogus to what activity in systems thinking?

   A. Analysis
   B. Management
   C. Synthesis
   D. Engineering

9. Why is it important to carefully prepare the project definition?

   A. It is used as a basis for funding decision
   B. It is the foundation upon which all subsequent project effort is built
   C. It is the primary basis for staff assignments
   D. It is the foundation upon which important documents are prepared.

Indicate whether the statements listed below are true or false by writing a T or F on the line.

10. _____The accomplishment of all the lower level tasks results in the attainment of the project goal(s)

11. _____The first sub-division of the goal is often termed task.

12. _____The task or sub-task is the basic unit of the project goal.

13. _____A work package should be associated with two or three persons

14. _____A work package is a task or set of sub-tasks whose accomplishment will contribute to the finished product identified by the project goal.

15. _____The concept of goal incorporates the idea of the end product of the effort.

Turn the page and check your answers

Lesson 2--Project Definition

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 2 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the project definition process and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 2.7 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 2.27.
2. Read the lesson narrative beginning on page 2.8 and then turn to the Lesson Quality Control Form on page 2.27.
3. Read Chapter Five of Educational Project Management by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 2.27.
4. Study the additional examples beginning on page 2.22 and then turn to the Lesson Quality Control Form on page 2.27.
5. Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 2.27.

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the project definition process and should now turn to the Lesson Qaality Control Form on page 2.27. Additional examples on creating work breakdown charts are found beginning on page 2.22. References for additional reading are listed on page 2.26.

Multiple Choice

1. C
2. B
3. C
4. B
5. A
6. A
7. D
8. A
9. B

True/False

10. T
11. F
12. T
13. F
14. T
15. T

Lesson 2--Project Definition

Additional Example 1

The Metropolitan City School Board has voted to commence planning action for construction of a new middle school building. You have been designated as project manager for planning and coordinating the construction of the building. This planning includes getting teaching staff suggestions and specifications for the new building, site selection, architectural plans, construction planning and equipment procurement. The various teachers' committees, the central office staff, and Mr. Jones of the Jones & Smith Architect firm are available as resource persons. You are to establish the goal, mission, and task statements and to arrange them into a work breakdown structure. You are to report the preliminary project definition in chart form to the next school board meeting.

The project goal is that the Metropolitan City Middle School building will be constructed in accordance with specifications and ready for occupancy on the projected date.

The missions of the project include:

A. the development of educational specifications for the building.
B. the selection and development of the building site.
C. the development of the architectural and engineering plans.
-
- (and so on)

The tasks of the project involve:

A_1. the development and collection of the various instructional and service department requirements for the building.

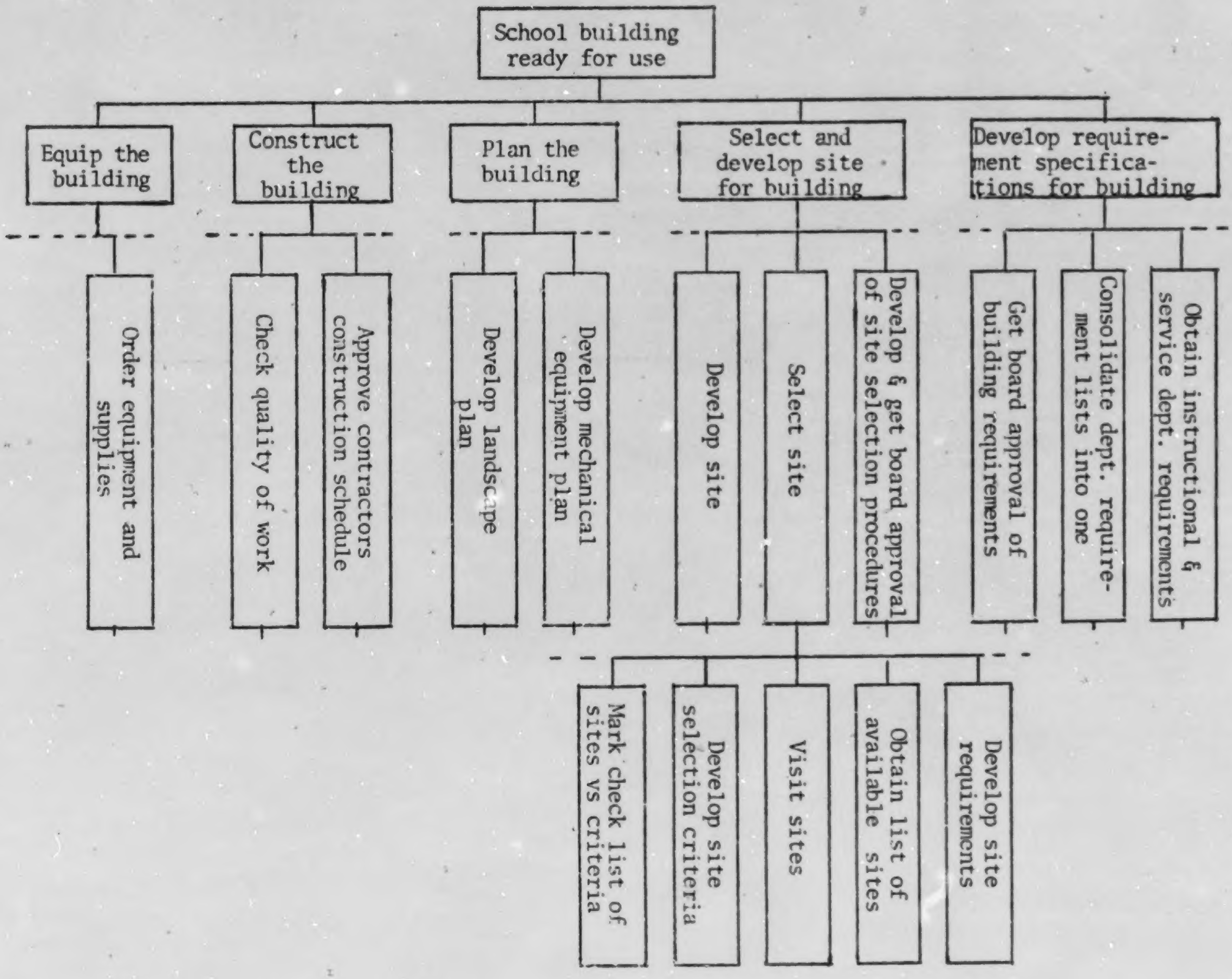
A_2. the consolidation of the various requirement plans into one set of specifications.

A_3. the approval by the School Board of the specifications.

B_1. the development and Board approval of site selection procedures.

-
- (and so on)

Example 1 (continued)


School building ready for use
Equip the building
Construct the building
Plan the building
Select and develop site for building
Develop requirement specifications for building
Order equipment and supplies
Check quality of work
Approve contractors construction schedule
Develop landscape plan
Develop mechanical equipment plan
Develop site
Select site
Develop & get board approval of site selection procedures
Get board approval of building requirements
Consolidate dept. requirement lists into one
Obtain instructional & service dept. requirements
Mark check list of sites vs criteria
Develop site selection criteria
Visit sites
Obtain list of available sites
Develop site requirements

Lesson 2--Project Definition

Additional Example 2

General Situation:

The Metropolitan School District has received a request for proposal from the Educational Research Laboratory which is a department of the United States Office of Education. This request asks for a research design concerning the effectiveness of self-instructional materials in teaching statistics at the high school level. You are to plan the various goal, missions or tasks necessary for the research design. The self-instructional materials and the materials for three teacher-led classes will be supplied. You are to prepare the research including a chart which shows the work breakdown structure of the goal-mission-task hierarchy.

The overall goal is the development of a plan for an experimental project.

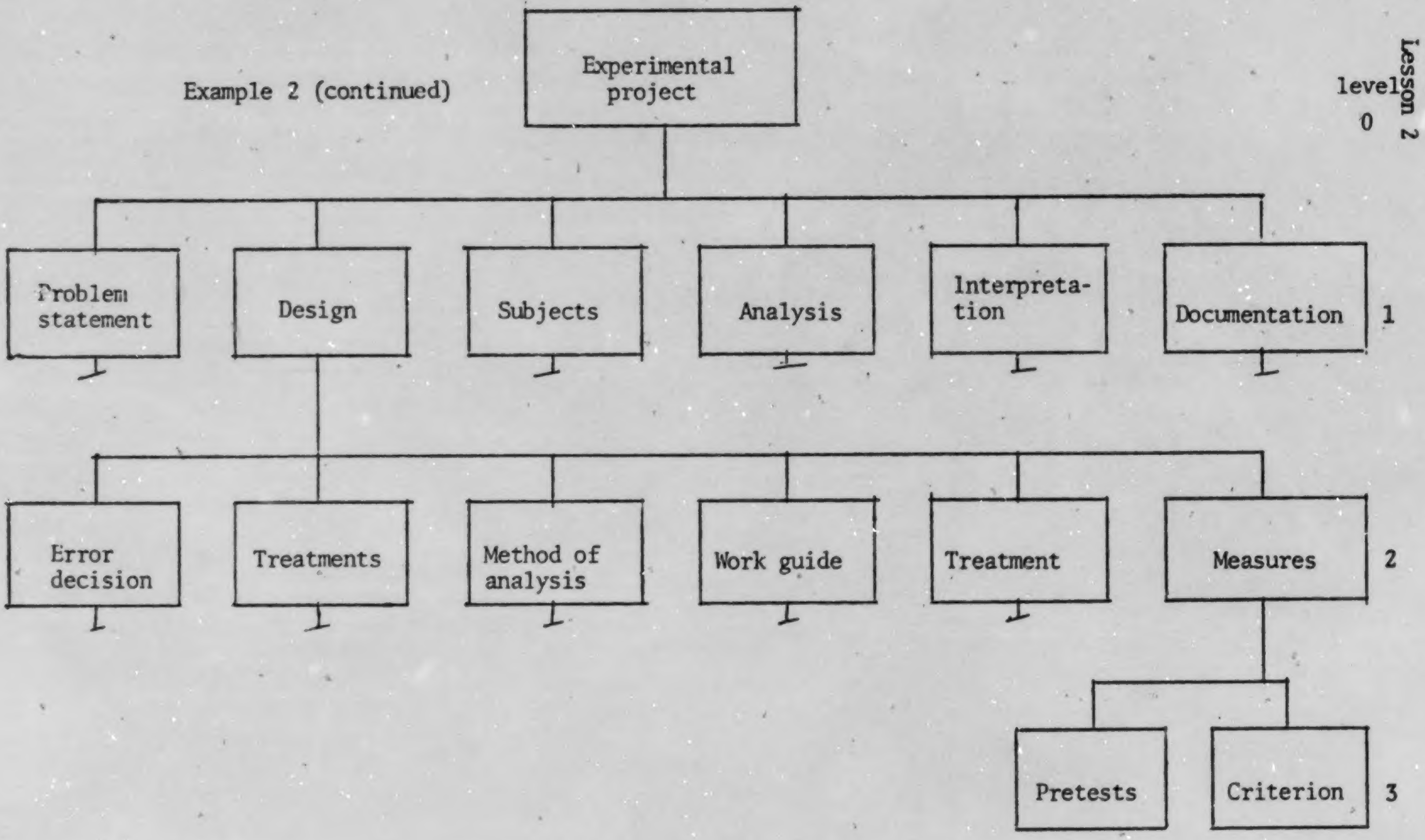
The various missions include:

A. the definition of the problem statement.
B. the development of the research design.
C. the specification of the procedures for assigning subjects to the various groups.
-
- (and so on)

The tasks of the project include:

B_1. the specification of the treatments which are variable across the groups of subjects.
B_2. the development of the method which is to be used in the analysis.
B_3. the preparation of the work guide which controls the experiment.
-
- (and so on)

Example 2 (continued)


Experimental project
level
0
Problem statement
Design
Subjects
Analysis
Interpretation
Documentation
1
Error decision
Treatments
Method of analysis
Work guide
Treatment
Measures
2
Pretests
Criterion
3

Adapted from D. L. Cook, Program Evaluation and Review Technique, U. S. Government Printing Office, 1966.

Lesson 2--Project Definition

Reading References

Additional knowledge about defining the project and specifying project objectives can be obtained by reading from the references cited below.

Archibald, R. D., and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, Chapter 2.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 2.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 5.

Woodgate, H. S. Planning by Network. Second Edition. London, England: Business Publications, Ltd., 1967, Chapter 12.

Lesson 2--Project Definition

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 2--Project Definition

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on project definition is now completed. Lesson 3 entitled "Work Flow" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory pages.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 3 -- Developing a Work Flow

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 3--Developing a Work Flow

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson. 3.1
Overview and objectives 3.2
Pretest 3.4
Lesson abstract and content outline 3.6
Lesson text 3.10
Exercises on work flow development. 3.18
Post-Test 3.32
Additional examples 3.34
Reading references. 3.38
Lesson Quality Control Form 3.39

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 3--Developing a Work Flow."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 3--Developing a Work Flow."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen
coin or compass to draw circles

TIME REQUIRED. The tape-slide presentation runs approximately 13 minutes, the exercises take approximately 60 minutes, and about 90 minutes is needed to complete the entire lesson.

Lesson 3--Developing a Work Flow

Overview and Objectives

OVERVIEW

The previous lesson presented the first step in the project planning phase--that of project definition. That step was concerned with establishing the goal, mission, and tasks for the project. The end product of this phase was the work breakdown structure.

This lesson is concerned with the process of developing a graphical representation which shows the logical sequence or order as to when each task in the project will be accomplished in order to achieve the overall project objective. The lesson represents the activities involved in carrying out the second step of the project planning phase.

OBJECTIVES

As a consequence of completing this lesson, the student should be able to create a proposed work flow in a graphical manner when given a work breakdown structure for a project.

The specific objectives of the lesson are as follows:

1. The student should be able to draw a work flow
2. The student should be able to check and correct a given workflow chart for completeness and logical order by tracing an example of tasks through the work flow.
3. The student should be able to rearrange the logic flow in a given faulty work flow by using a variety of techniques for adjustment so that the work flow accomplishes the overall goal.
4. The student should be able to designate from a given work flow and work breakdown structure those significant points of accomplishment which are designated as milestones.

5. The student should be able to create a complete and logical work flow chart, including milestones, given a work breakdown structure.

Complete the pretest on the following page.

Lesson 3--Developing a Work Flow

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated___________.

1. What is the major function or purpose of the project work flow?

   A. To present a visual display of the sequential arrangement of the various tasks determined in the project definition
   B. To aid in highlighting major gains in the project
   C. To display the various events in the project operation
   D. To display the various tasks and events in the project preparation phase

2. Activity diagrams are especially useful when the project involves:

   A. Many different personnel working on project activities
   B. Relatively few activities
   C. Many activities
   D. Little consideration among individuals and departments within the school district

3. What criteria is usually used for defining an event?

   A. Have a schedule data
   B. Focus upon tasks
   C. Represent a clearly difinable point of occurrence
   D. Enables the planner to associate responsibilities and activities

4. What type or category of work flow focuses upon the start and finish of the tasks?

   A. Activity-oriented diagram
   B. Event-oriented diagram
   C. Bar diagram
   D. Gantt chart

5. In an "activity-oriented" work flow, where is the major focus placed?

   A. Only on the start of the tasks
   B. Tasks or activities which have to be accomplished
   C. Only on the finish or completion of tasks
   D. On both the start and finish of tasks

6. The project work flow clearly represents what characteristics of project tasks?

   A. Only sequence
   B. Only sequence and constraints
   C. Only sequence and interdependencies
   D. Sequence, constraints and interdependencies

7. To what subsequent steps does the work flow diagram provide a basis in the project planning process?

   A. Time estimating, scheduling and costing
   B. Reporting and transferring personnel, records and equipment
   C. Determining personnel, equipment and materials
   D. Analyzing problems and implementing decisions

8. Why is the development of work flow important to a project?

   A. Helps to formulate the plan for the project effort
   B. Aids in highlighting major project problems
   C. Serves as a project operations guide for the superintendent and his assistants
   D. Represents points of divergence in the project plan

9. What is the chief function of milestone event?

   A. Signals a major accomplishment or completion point in the project
   B. Provides the basis for resource estimation
   C. Serves as a guide for personnel recruitment
   D. Represents the completion of the project

Indicate whether the statements listed below are true or false by writing a T or F on the line.

10. _____The work flow diagram serves as a communication medium between project personnel.

11. _____An event specifies only the start of an activity

12. _____Activities or tasks consume both time and resources.

13. ____In the development of event-oriented networks or flow diagrams arrows are used to represent activities.

14. ____In flow diagrams triangles are used to represent tasks.

15. ____The development of a network can be accomplished by starting with the last task and working toward the first task.

Turn the page and check your answers.

Lesson 3--Developing a Work Flow

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 3 pretest are listed down the right margin. Check your correct responses. In scoring your answer, if any part of your response is incorrect, the whole item is incorrec for purposes of evaluating pretest performance.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the process of developing a work flow and should read the lesson abstract and content outline beginning on page 3.6. Then begin the content presentation by turning to the Instructions on page 3.9.

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the work flow development process and should read the lesson abstract and content outline on page 3.6. Then if you desire to skip the content presentation, you may do so by proceeding directly to the practice exercise on page
If you do desire to view the content presentation turn to the Instructions on page 3.9.

Multiple Choice

1. A
2. C
3. C
4. B
5. B
6. D
7. A
8. A
9. A

True/False

10. T
11. F
12. T
13. T
14. F
15. F

Lesson 3--Developing a Work Flow

Lesson Abstract and Content Outline

ABSTRACT

The concept of work flow is defined and its relationship to the overall project planning phase established. Basic principles of construction and commonly used symbols are presented. Emphasis is given to the use of event-oriented and activity-oriented network diagrams or charts as a means of showing the sequence and logical order in which project tasks identified in the work breakdown structure or project definition step must be accomplished. The importance of the graphical representation as a logical tool, a communication device, and a means of project control are cited.

CONTENT OUTLINE

A. Work flow is the logical arrangement of the various tasks of the project definition.

   1. The development of the work flow is important because it:

      a. shows the logic of the planner,
      b. forces the formulation of a plan,
      c. serves as a communication link among staff, and
      d. serves as a device for noting project process.

   2. A work flow diagram is the visual organization and sequence logic of the project tasks. Two basic types of diagrams or charts are used in exhibiting work flows:

      a. event-oriented, where the start and completion of each task is emphasized. PERT makes use of the event-oriented work flow diagrams.

      b. activity-oriented, where the emphasis is placed upon the work taking place during the tasks, upon the products which are inputs to and outputs from the tasks, and their sequential flow.

B. A variety of principles and procedures for creating work flow diagrams have been developed.

1. Various symbols are used to represent operations and processes:

    a. a circle for events, a box for activities;
    b. a solid arrow for activity (event-type) or for input/output flow (activity-type);
    c. a dotted arrow for a dummy activity which does not use time or resources;
    d. a diamond for a yes/no decision point; and
    e. backflowing arrow for feedback.

2. Dependency among and between events or activities can occur in series, in parallel, in a burst from one to many, or in a merge of many to one.

3. A selection of styles exists for presenting task sequence in a work flow:

    a. event circles with activity arrows,
    b. arrow activity sequence,
    c. box activity sequence,
    d. box activity with flow arrows, decisions points, and feedback (called a flow process chart),
    e. box activity with start/stop times (ends of the box), task levels, and flow arrows (called a Gantt or bar chart).

C. The logic of developing a work flow is of the antecedent-consequent type but where tasks are linked by a time sequence.

1. Examples of this type of logic are:

    a. a chemical mix of two elements,
    b. a psychomotor reflex from a stimulus,
    c. a toy or model with parts to be assembled in order.

2. The process of arranging the tasks in a work flow initially can be performed by using any one of three approaches:

    a. starting with the first task and working toward the end task,
    b. starting with the end task and working toward the start,
    c. starting with a middle task and working toward both the start and end tasks.

3. Faulty work flow diagrams do not accomplish the end product and/or leave out fundamental logic steps or sequences.

4. Correction of a faulty work flow is accomplished by revising or adding the necessary steps or sequences.

D. Milestone events, such as reports or conferences, are especially important start or completions points for tasks in the project. These milestones should be specially tagged or identified in the work flow.

E. A wide variety of techniques and procedures have been developed to assist in the graphical representation of project work flow. Some of the more common techniques are as follows:

1. Gantt or bar chart,
2. Flow process charts,
3. Line of balance diagram,
4. Network diagram,
5. Milestone chart,
6. Critical path analysis.

F. The choice of a particular technique is left to the individual project in terms of its needs and situation. There is no one technique which can be applied to all project situations.

Lesson 3--Developing a Work Flow

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance to the position marked Module 2--Basic Principles and Techniques of Project Management, Lesson 3--Developing a Work Flow.*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 3--Developing a Work Flow

Lesson Text

Introduction

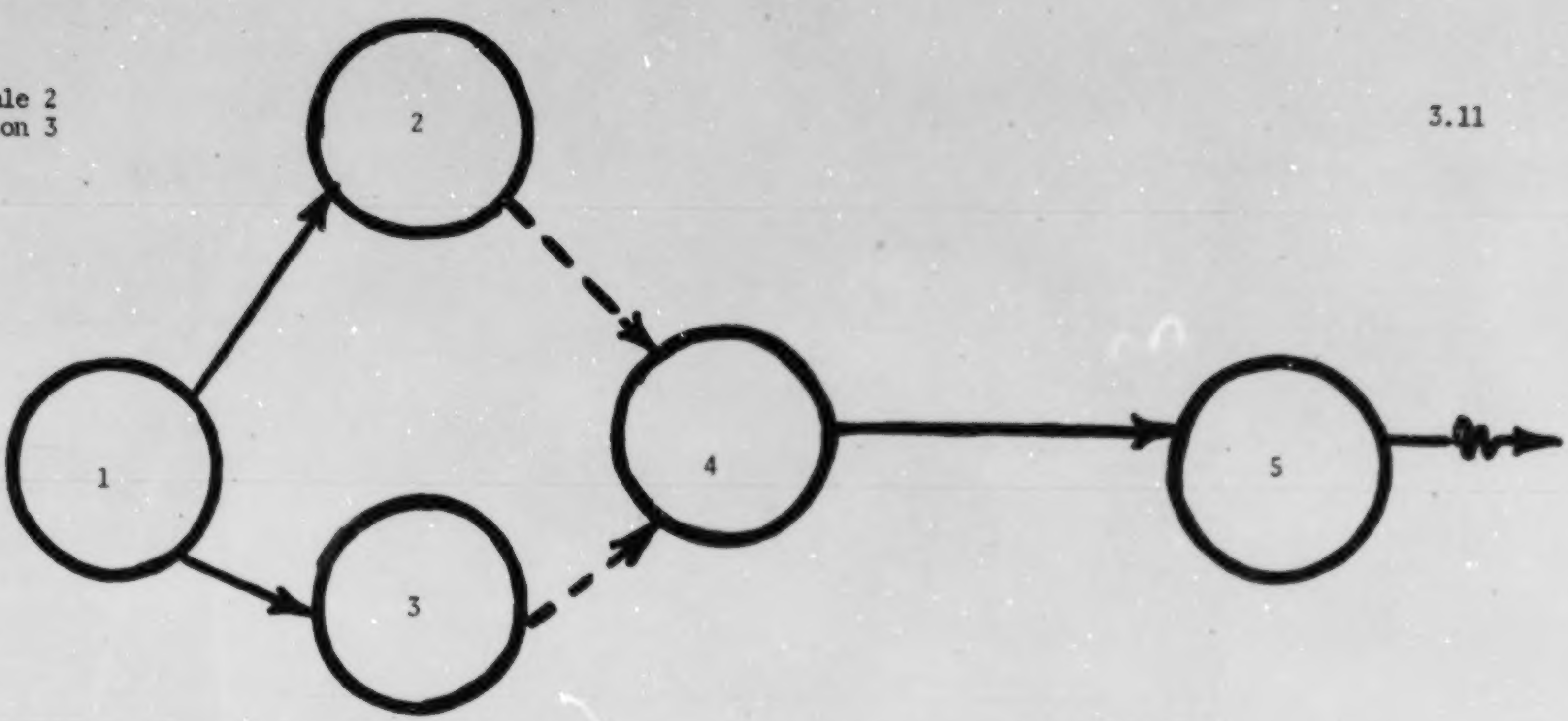
Once the project has been defined, that is, the end product specified and the set of tasks determined and arranged into a work breakdown structure, the project planner is ready to develop the work flow.

The work flow is a visual display, or "roadmap", of a proposed order of task accomplishment from the start of the project to its completion. It is important to the project in that it shows visually the logical order of the project activities, serves as a communication medium among project personnel, provides a basis for marking the progress of the project, and aids in highlighting major areas of risk or uncertainty.

Work flow diagrams are often constructed either as an event-oriented diagram, where the major focus is upon the start and finish of the project tasks, or as an activity-oriented diagram where the major focus is upon the tasks, activities or work that must be accomplished. These two basic styles of diagram construction and their advantages are discussed in the sections which follow.

Event-Oriented Diagrams

An event specifies the start or stop of a task. It is a point in time, and does not consume resources. It is usually represented by a circle. The description of an event must meet the following criteria: specify a clearly definable point of occurrence in time, convey uniformity of understanding, and be capable of verification. The start statement for a task is placed in a circle and the stop statement is placed in another circle. These events are called the start event and the completion event. The task or activity is



Event Numbers	Event Descriptions
1	Start Instructional Objective Writing and Start Instructional Content Writing
2	Complete Instructional Objectives
3	Complete Instructional Content
4	Complete Test Plan and Start Selection of Item Writer
5	Complete Selection of Item Writer

Figure #1--Partial Event Oriented Diagram with Event Descriptions represented as an arrow which connects the start and completion events. Since the start of a subsequent activity is often coincidental with the completion of a previous activity, one circle can represent both the completion of one task and the start of the next sequential task. Examples of start and completion events are shown in Figure #1.

The event-oriented diagram allows management effort to be concentrated on the accomplishment of each of the various tasks, so that the interrelatedness of the tasks can be coordinated. Such diagrams are especially important for projects with either a great number of tasks or a high degree of interrelatedness among the tasks.

Another important concept is the designation of milestone events. A milestone event is an event whose completion signals a major accomplishment for the project and without which the project could not be completed. Milestones often represent a gathering point for several activities, a point of divergence for several activities, an interim project conference report, or a point within the project about which there exists considerable risk and uncertainty. The project manager identifies those events which are to serve as milestones. These milestones serve as a flag to signal major progress in the course of the project.

The symbols most commonly used in the development of event-oriented networks are circles which represent events, triangles which represent milestone events, arrows which represent activities, dotted arrows which represent logical or planned constraints which do not consume time or resources (sometimes referred to as dummy activities). Events are connected by arrows which either represent a time- and resource-consuming activity or merely a constraint upon the start or completion of an event. An example of an event-oriented diagram is presented in Figure #1.

Activity-Oriented Diagrams

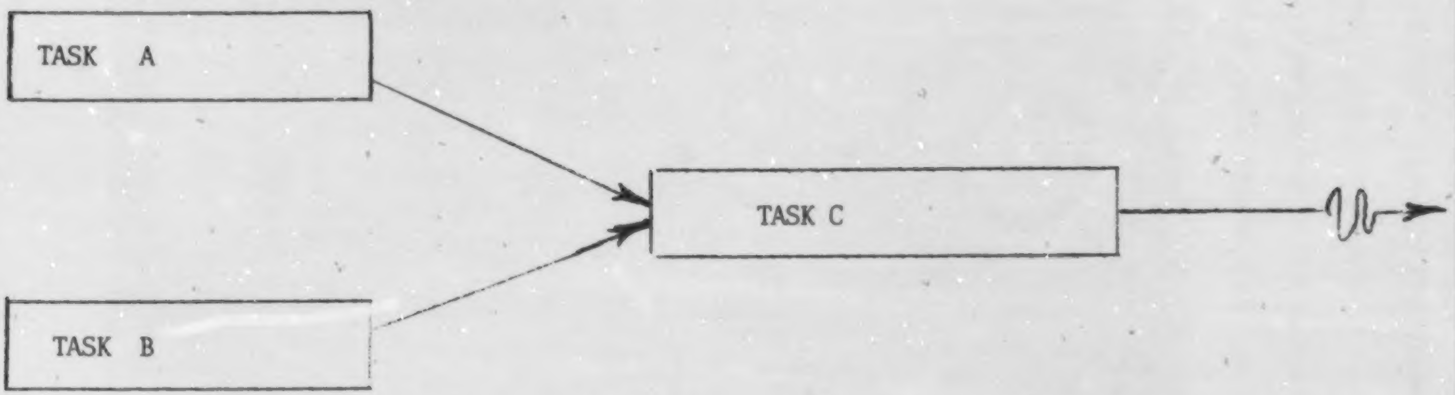
The activity-oriented diagram allows management effort to be concentrated on the state of action within a given task. Activity diagrams are especially useful when the project involves relatively few tasks or when the interrelatedness of the tasks is minimal.

An activity represents a project task or work package and, consequently, represents the consumption of time and resources. The description of an activity must meet the following criteria: The description must specify either physical or mental work, be of sufficient detail so that the planner is able to associate required time and resources with the activity, enable the planner to determine responsibility for the activity, convey a uniformity of understanding, and permit the activity to be observed and measured.

In an activity-oriented diagram a box often represents an activity and an arrow indicates the flow of information between two sequential activities. The input to an activity is the output of the previous activity. Simplistically, this is the concept of input-process-output often explained in books on systems. An example of an activity-oriented diagram is presented in Figure #2.

Constructing the Work Flow Diagram

The logic used in developing the sequence of tasks in a work flow diagram implies a cause and effect relationship, where each task is related to other tasks over time. The process of ordering tasks is best accomplished by asking oneself questions about the logical connections between all pairs of events, tasks, or activities. The purpose of this effort is to clearly represent the sequence, constraints, and interdependencies of all project tasks.



Activity/Task Letter	Activity/Task Description
A	Write Instructional Objectives
B	Write Instructional Content
C	Select Item Writers

Figure #2--Sample Portion of an Activity-Oriented Diagram with Activity/Task Descriptions

An example of dependency is the building of some plastic model airplanes where certain parts must be assembled before other parts. That is, specific sequential assembly steps must be followed to ensure that the interior parts are attached to the wing or fuselage halves prior to the assembly of the fuselage and wings into the whole airplane. In the work flow, the tasks identified in the work breakdown structure are placed in a sequential order that is based upon logical or desired relationships. Thus, the input to each task is seen as the output of one or more previous tasks. Also, tasks may be performed in parallel or concurrently (that is, at the same time).

The development of the work flow can be accomplished by starting with the first task and working toward the last task, starting with the end task and working the antecedent-consequent task relationships backwards to the starting task, or by selecting some "middle" task and expressing task relationships in both directions until the start and end tasks are reached.

Faulty work flow diagrams can result in misdirected project effort and wasted resources. Attention to the "correctness" of the work flow diagram while planning a project can result in a more effective and efficient project effort. Faulty work flow diagrams are those which do not show clearly the route to the accomplishment of the stated end product, lack a single termination or end event, lack decision points, have activities where an antecedent activity was not performed, or have closed loops that direct the work effort in a never ending cycle. Corrections of faulty work flow diagrams are accomplished by adding tasks to the flow, removing tasks, adding decision points, branches or feedback to the flow, or by removing decision branches or feedback.

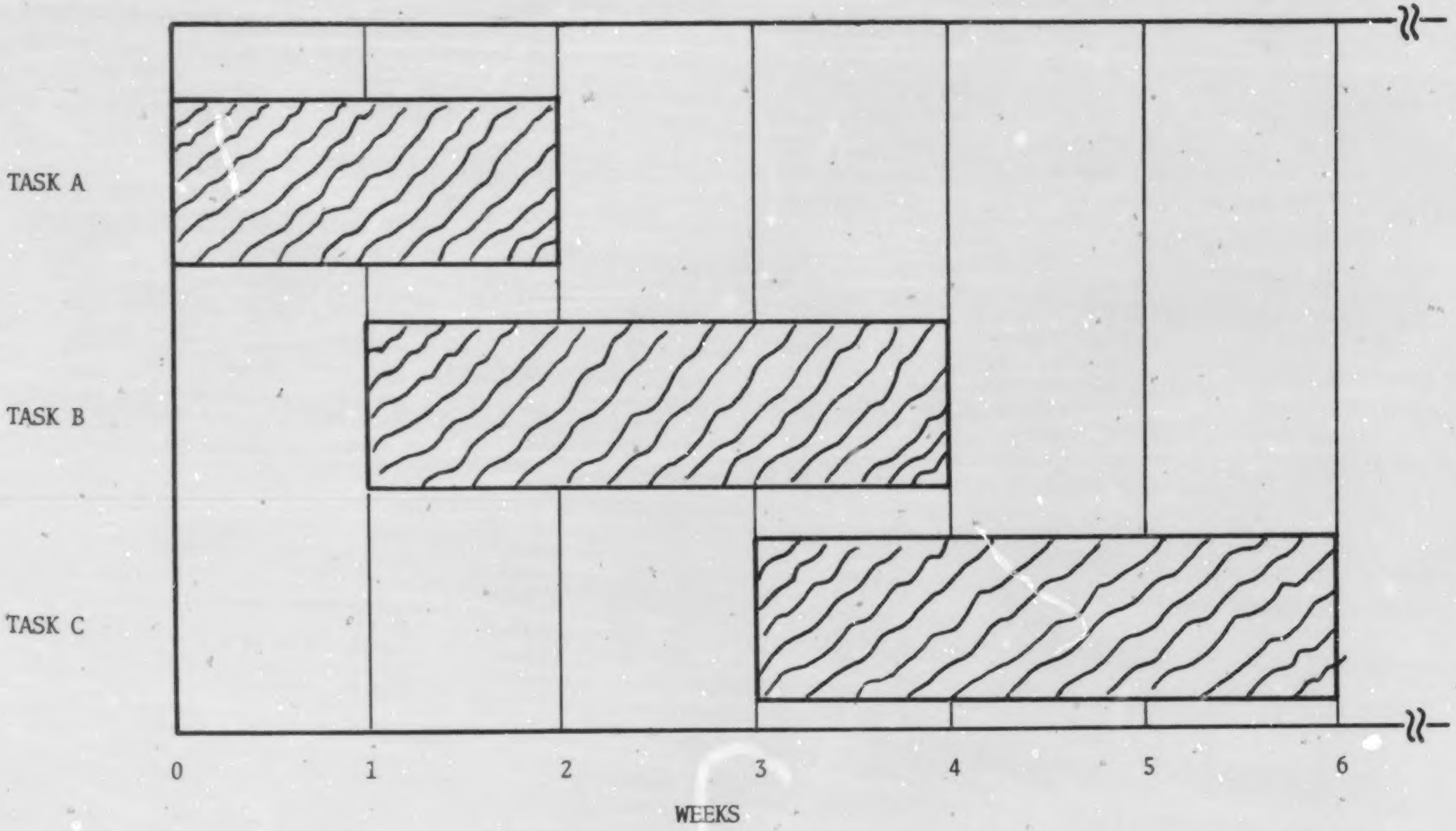


Figure #3--Sample Portion of a Project Gantt Chart

Summary

The work flow diagram is a visual representation of the various tasks or activities which comprise the project. The diagram shows the logical arrangement and the interrelatedness of the various tasks. Two basic types of work flow diagrams are often employed. An event-oriented diagram is used when task accomplishment is the project manager's primary concern. An activity-oriented diagram is used when the activities are the primary focus of the project manager.

Various charts or diagrams have been developed to allow managers to visually represent the project effort. The names of some specific kinds are the "Gantt chart" and "networks". Examples of the latter are the "milestone chart", "critical path diagram" and "network diagram". An example of a Gnatt chart is presented in Figure #3. The event-oriented diagram in Figure #1 is an example of what would be labeled a "network diagram".

Regardless of the type used, the project work flow diagram serves as the basis for the subsequent project planning steps of time estimating, scheduling, and costing.

Read the directions for Exercise A. on the next page.

Lesson 3--Developing a Work Flow

Exercise A

Directions: Study carefully the situation described below and carry out the activities as noted.

The Metropolitan School District is planning to conduct an inservice training workshop retreat. You are designated as project director. Indicate for the tasks below what you believe is the order in which they might be accomplished. Use "1" for the first task in the sequence, "2" for second, and so on.

1. Perform a follow-up study of the workshop participants to get information on change of attitude. 1. ____
2. Make teaching staff assignments to write and deliver the presentations at the program. 2. ____
3. Survey the entire school district staff for possible teacher instructors for the program. 3. ____
4. Write objectives and script for each program presentation. 4. ____
5. Conduct analysis of completed pre/post tests and presentation evaluation forms. 5. ____
6. Design and produce the instructional media materials for each presentation. 6. ____
7. Develop pre/post test and evaluation forms (a section of which asks about media effectiveness). 7. ____
8. Conduct a meeting between teacher instructors and a media specialist. 8. ____

Turn the page when you have finished.

Lesson 3--Developing a Work Flow

Exercise A--Solution

Directions: Given below is a suggested possible order for the tasks. Check your responses against the given key. If you did not have all of them correct, do not be disturbed since various persons can see the tasks or activities being done in slightly different orders.

If you feel the need for additional instruction on this point, you can review the ideas contained in the lesson or check one of the options listed on Page 3. . After your review, move on to Exercise B on the next page. If you do not review, go right on to the next page.

1. Perform a follow-up study of the workshop participants to get information on change of attitude. 1. 8

2. Make teaching staff assignments to write and deliver the presentations at the program. 2. 2

3. Survey the entire school district staff for possible teacher instructors for the program. 3. 1

4. Write objectives and script for each program presentation. 4. 3

5. Conduct analysis of completed pre/post tests and presentation evaluation forms. 5. 7

6. Design and produce the instructional media materials for each presentation. 6. 5

7. Develop pre/post test and evaluation forms (a section of which asks about media effectiveness). 7. 6

8. Conduct a meeting between teacher instructors and a media specialist. 8. 4

Lesson 3 - Developing a Work Flow

Exercise B

Directions: The lesson indicated that there were several ways that the work flow could be graphically represented. The purpose of this exercise is to introduce you to some of the symbols and procedures that are often employed. For each of the three tasks given below, complete the worksheet to show how they would appear in an actual work flow.

Module 2
Lesson 3

Task	Show as a Start event	Show as an End Event	Show as an Activity Arrow	Show as an Activity Box	Show as an Activity Box with Start and End Points
1. Arrange for motel accomodations by name for the participating teachers and workshop staff.					
2. Write objectives for program presentations.					
3. Design and produce the instructional media materials for the program.					

After completing the exercise, turn the page to check your answer.

Lesson 3--Developing a Work Flow

Exercise B--Solution

Directions: After comparing your answers to the solution, make corrections on your answers as necessary. Then proceed to Exercise C on the next page.

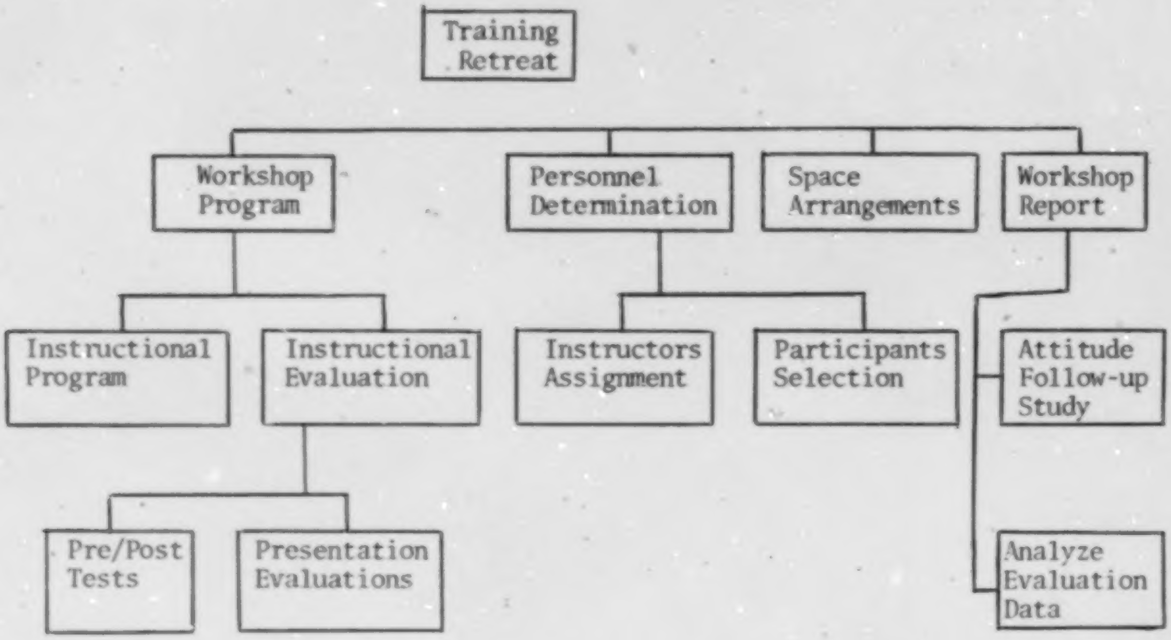
Activity Basic Description	Show as a Start event	Show as an End Event	Show as an Activity Arrow	Show as an Activity Box	Show as an Activity Box with Start and End Points
1. Arrange for motel accommodations by name for the participating teachers and workshop staff.	Start Motel Accommodations	Complete Motel Accommodations	Make Motel Accommodations →	→ Make Motel Accommodations →	S C Make Motel Accommodations
2. Write objectives for program presentations.	Start Program Objectives	Complete Program Objectives	Write Program Objectives →	→ Write Program Objectives →	S C Write Program Objectives
3. Design and produce the instructional media materials for the program.	Start Instructional Materials Design	Complete Instructional Materials Design	Design Instructional Materials →	→ Design Instructional Materials →	S C Design Instructional Materials

Lesson 3--Developing a Work Flow

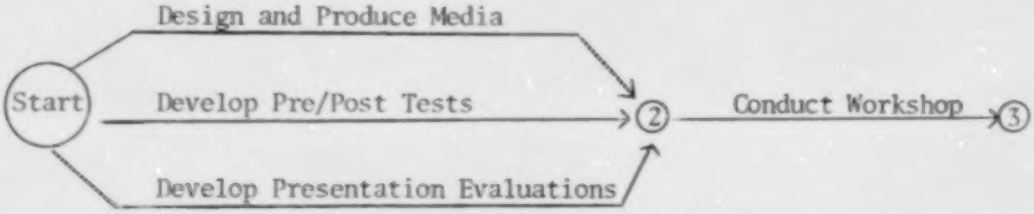
Exercise C

Directions: Given below is a project definition (work breakdown structure) for the training retreat noted in Exercise A. Your task is to finish the incomplete work flow using the network approach. For convenience, write the activity descriptions on the arrow lines as illustrated for the first portion of the network. When finished, turn the page and check your work.

A. Project Definition


Training Retreat
Workshop Program
Personnel Determination
Space Arrangements
Workshop Report
Instructional Program
Instructional Evaluation
Instructors Assignment
Participants Selection
Attitude Follow-up Study
Pre/Post Tests
Presentation Evaluations
Analyze Evaluation Data

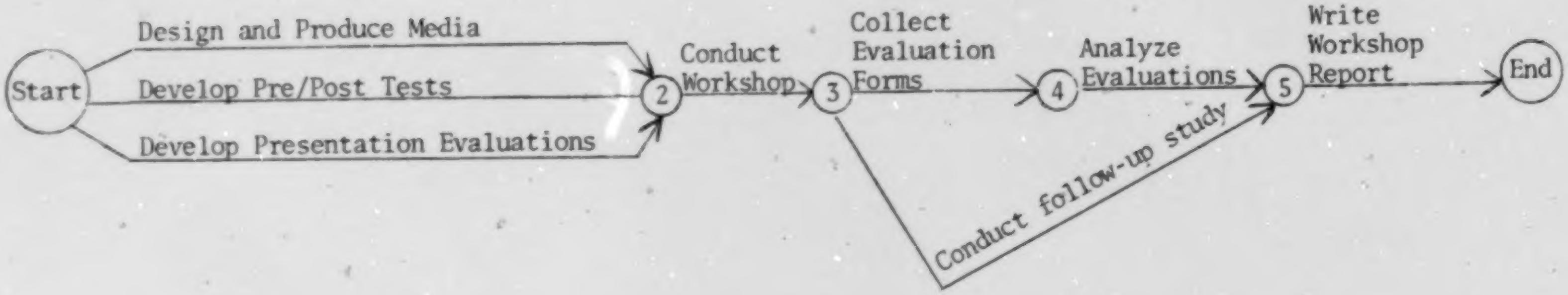
B. Work Flow (to be completed)


Design and Produce Media
Start
Develop Pre/Post Tests
Develop Presentation Evaluations
2
Conduct Workshop
3

Lesson 3--Developing a Work Flow

Exercise C--Solution

Directions: Given below is one possible work flow. Yours should look somewhat like this but does not have to be identical. Study the suggested work flow, then proceed to Exercise D on the next page.


Start
Design and Produce Media
Develop Pre/Post Tests
Develop Presentation Evaluations
2
Conduct Workshop
3
Collect Evaluation Forms
4
Analyze Evaluations
Conduct follow-up study
5
Write Workshop Report
End

Lesson 3--Developing a Work Flow

Exercise D

Directions: Given below is a list of tasks or activities which are necessary in order to conduct an inservice retreat being planned by the Metropolitan High School District. You are designated as the project manager. Construct both an event- and an activity-oriented work flow diagram which will represent the general sequence in which the task should be done. The tasks are some of those which have been identified in the project definition effort. Underlined words should be used in your diagrams as abbreviated descriptions or titles for events and activities.

Task 1. arrange for hotel accommodations by name for the participating teachers and workshop staff.

Task 2. develop the pre and post tests and evaluation forms for the instruction presentations.

Task 3. make teaching staff assignments to write and deliver presentations at the instructional program.

Task 4. design and produce the instructional media materials for the program.

Task 5. plan the workshop presentation program in general terms.

Task 6. select the teachers from the school district who will be the participants.

Task 7. arrange for the retreat location, obtain a hotel conference room.

Task 8. survey the entire school district staff for possible participants.

Task 9. write objectives and script for each program presentation.

Task 10. conduct the workshop.

Turn the page for worksheets to be used for Exercise D.

Lesson 3--Developing a Work Flow

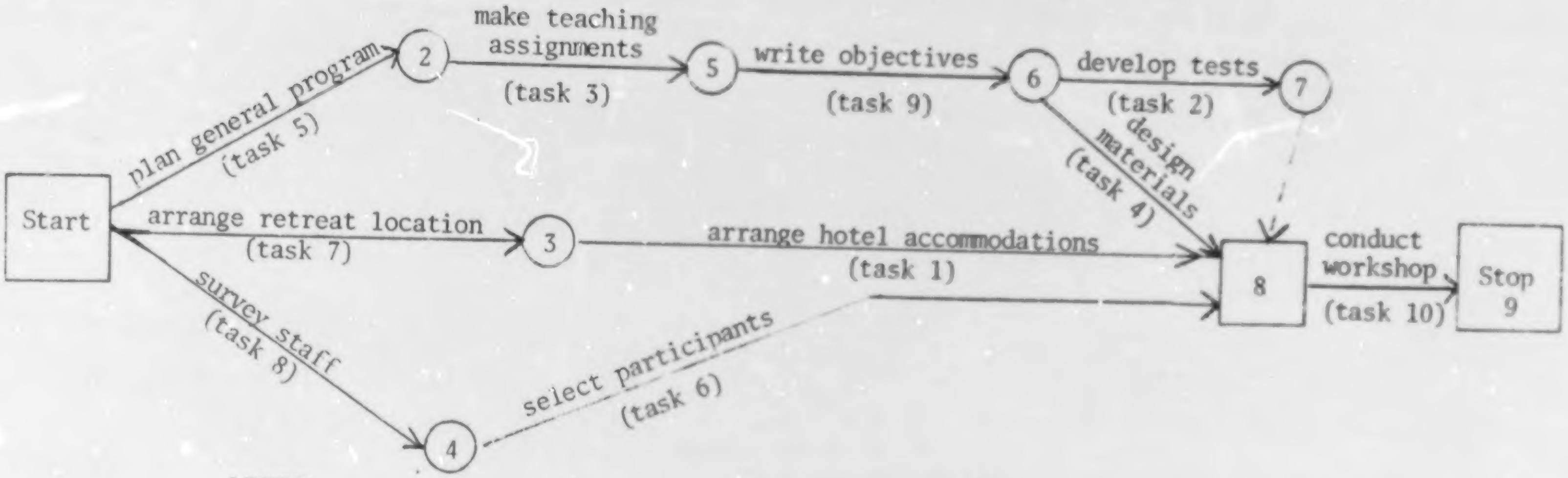
Exercise D--Worksheet 1

Directions: Use this worksheet to construct your activity-oriented network. Write a brief description of each task on the arrow line. When you have finished, turn to the next page and compare your drawing to the suggested solution.

Lesson 3--Developing a Work Flow

Exercise D--Worksheet 1--Solution

Directions: Check your drawing against the one provided below. If yours is not exactly like the one presented, do not worry. As long as you are in the ball park, your answer is acceptable. Task numbers have been supplied to help you more easily identify the several activities.


Start
plan general program
(task 5)
2
make teaching assignments
(task 3)
5
write objectives
(task 9)
6
develop tests
(task 2)
7
design materials
(task 4)
arrange retreat location
(task 7)
3
arrange hotel accommodations
(task 1)
survey staff
(task 8)
4
select participants
(task 6)
8
conduct workshop
(task 10)
Stop
9

LEGEND

☐ = Milestone event

→ = Activity or task

After checking your answer, proceed to the next page and complete worksheet 2.

Lesson 3--Developing a Work Flow

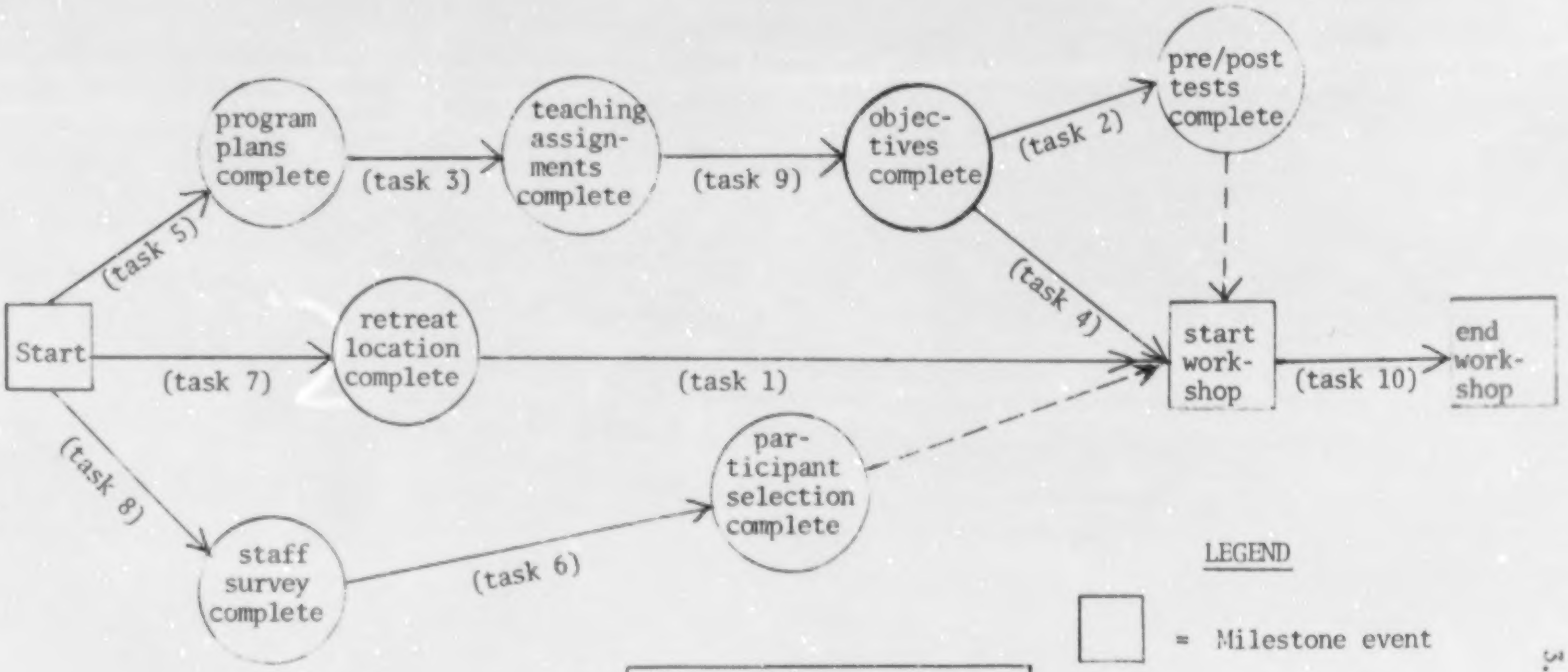
Exercise D--Worksheet 2

Directions: Use this worksheet to construct your event-oriented work flow. After you have drawn the work flow, compare your drawing to the suggested solution on the next page.

Lesson 3--Developing a Work Flow

Exercise D--Worksheet 2--Solution

Directions: Check your flow chart against the one provided below. If yours is not exactly like the one presented, do not be overly concerned. If you have the events identified properly as shown, you are all right. Your sequence might not be the same, but this often occurs when persons develop work flows for projects.


Start
(task 5)
program plans complete
(task 3)
teaching assign-ments complete
(task 9)
objec-tives complete
(task 2)
pre/post tests complete
(task 4)
(task 7)
retreat location complete
(task 1)
start work-shop
(task 10)
end work-shop
(task 8)
staff survey complete
(task 6)
par-ticipant selection complete

LEGEND

□ = Milestone event

→ = Activity

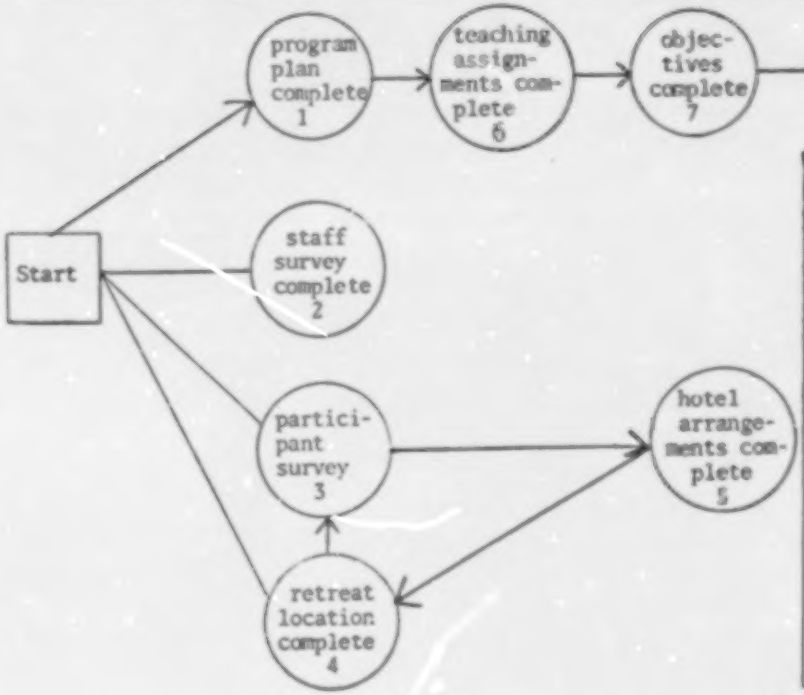
- - - -> = Constraint (Dummy activity)

After you have checked your answer, proceed to the next page and complete Exercise E.

Lesson 3--Developing a Work Flow

Exercise E

Directions: Given below is a work flow developed as a response for Exercise D by a person like yourself learning about project management. Several errors exist in the drawing. Find as many as you can. Then list them in the space provided at the bottom of the page. You do not need to redraw the work flow.


Start
program plan complete 1
teaching assignments complete 6
objectives complete 7
media materials complete 8
workshop complete 9
staff survey complete 2
participant survey 3
hotel arrangements complete 5
retreat location complete 4

List errors here:

After listing errors, go on to the next page.

Lesson 3--Developing a Work Flow

Exercise E--Solution

Directions: Compare your list with those errors noted below.

The number of errors or mistakes detected will be a function of your sophistication with network techniques. As a minimum, you should have listed at least three of the following six errors.

1. The network is not drawn to completion. No definite end point tying all tasks together is presented.
2. The network or work flow is open or left hanging at events 5, 2, and 9.
3. An unnecessary arrow line exists between event 3 and 4. No constraint exists between these two events.
4. A loop exists involving events 3, 5, and 4. That is, movement is around in a circle in this part of the work flow.
5. Real task arrows or dummy constraint lines or arrows connecting event 2 and 5 to the start of the workshop are not present.
6. Milestone events are not identified by appropriate symbols.

You may have noted others but the above are errors which can be easily noted in the faulty work flow.

After checking your answer, turn the page.

Lesson 3--Developing a Work Flow

Directions and Choices Following the Practice Exercises

Based upon a self-evaluation of your performance on the several exercises in this lesson, you have

A. either acceptably satisfied the objective of developing a work flow for a project and should now turn to the post-test found on page 3.32.

Additional examples on developing a work flow are found on pages 3.34 to 3.37. References for additional reading are listed on page 3.38.

B. or not satisfied the objective, and should select one or more of the following courses of action.

1. If your work flow diagrams were generally correct except for small details of construction, then:

a. Study the additional examples beginning on page 3.34 and then rework exercises C and D on pages 3.22 and 3.24.

b. Read Chapter Six of Educational Project Management by Desmond L. Cook and then rework exercise D on page 3.24.

c. Rework exercise D on page 3.24.

2. If your work flows were not correct even at a general overall level, then either:

a. View the slide-tape presentation again; instructions are on page 3.9. After the presentation, rework exercises A, C, and D on pages 3.18, 3.22, and 3.24.

b. Read the lesson narrative beginning on page 3.10, and then rework exercises C and D on pages 3.22 and 3.24.

Lesson 3--Developing a Work Flow

Post-Test

Directions: Please take time to carefully answer the multiple choice questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_______.

1. What is the chief function of milestone event?

   A. Signals a major accomplishment or completion point in the project
   B. Provides the basis for resource estimation
   C. Serves as a guide for personnel recruitment
   D. Represents the completion of the project

2. Why is the development of work flow important to a project?

   A. Helps to formulate the plan for the project effort
   B. Aids in highlighting major project problems
   C. Serves as a project operations guide for the superintendent and his assistants
   D. Represents points of divergence in the project plan

3. To what subsequent steps does the work flow diagram provide a basis in the project planning process?

   A. Time estimating, scheduling and costing
   B. Reporting and transferring personnel, records and equipment
   C. Determining personnel, equipment and materials
   D. Analyzing problems and implementing decisions

4. In an "activity-oriented" work flow, where is the major focus placed?

   A. Only on the start of the tasks
   B. Tasks or activities which have to be accomplished
   C. Only on the finish or completion of tasks
   D. On both the start and finish of tasks

5. The project work flow clearly represents what characteristics of project tasks?

   A. Only sequence
   B. Only sequence and constraints
   C. Only sequence and interdependencies
   D. Sequence, constraints and interdependencies

6. What type or category of work flow focuses upon the start and finish of the tasks?

   A. Activity-oriented diagram
   B. Event-oriented diagram
   C. Bar diagram
   D. Gantt chart

7. What criteria is usually used for defining an event?

   A. Have a schedule data
   B. Focus upon tasks
   C. Represent a clearly definable point of occurrence
   D. Enables the planner to associate responsibilities and activities

8. Activity diagrams are especially useful when the project involves:

   A. Many different personnel working on project activities
   B. Relatively few activities
   C. Many activities
   D. Little consideration among individuals and departments within the school district

9. What is the major function or purpose of the project work flow?

   A. To present a visual display of the sequential arrangement of the various tasks determined in the project definition
   B. To aid in highlighting major gains in the project
   C. To display the various events in the project operation
   D. To display the various tasks and events in the project preparation phase

Indicate whether the statements listed below are true or false by writing a T or F on the line.

10. _____ An event specifies only the start of an activity.

11. _____ The work flow diagram serves as a communication medium between project personnel.

12. _____In the development of event-oriented networks or flow diagrams arrows are used to represent activities.

13. _____Activities or tasks consume both time and resources.

14. _____The development of a network can be accomplished by starting with the last task and working toward the first task.

15. _____In flow diagrams triangles are used to represent tasks.

Turn the page and check your answers.

Lesson 3--Developing a Work Flow

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 3 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not demonstrated acceptable knowledge of the work flow process and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 3.9 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 3.39.
2. Read the lesson narrative beginning on page 3.10 and then turn to the Lesson Quality Control Form on page 3.39.
3. Read Chapter Six of Educational Project Management by Desmond L. Cook, and then turn to the Lesson Quality Control Form on page 3.39.
4. Study the additional examples beginning on page 3.34 and then turn to the Lesson Quality Control Form on page 3.39.
5. Rework the lesson post-test found on page 3.32 and then turn to the Lesson Quality Control Form on page 3.39.

If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of work flow development and should now turn to the Lesson Quality Control Form on page 3.39. Additional examples on creating project work flows are found on page 3.34. References for additional reading are listed on page 3.38.

Multiple Choice

1. A
2. A
3. A
4. B
5. D
6. B
7. C
8. C
9. A

True/False

10. F
11. T
12. T
13. T
14. F
15. F

Lesson 3--Developing a Work Flow

Additional Example A

The last week's Executive Committee meeting of the Fairbanks Guidance Counselors' Association, it was noted that a speech on your many years experience with Educational Tests and Measurements would be a very suitable subject for next month's general meeting. Unfortunately, since you are secretary-treasurer of the Association, you not only have to give the talk but must arrange for the room, seating, and other details.

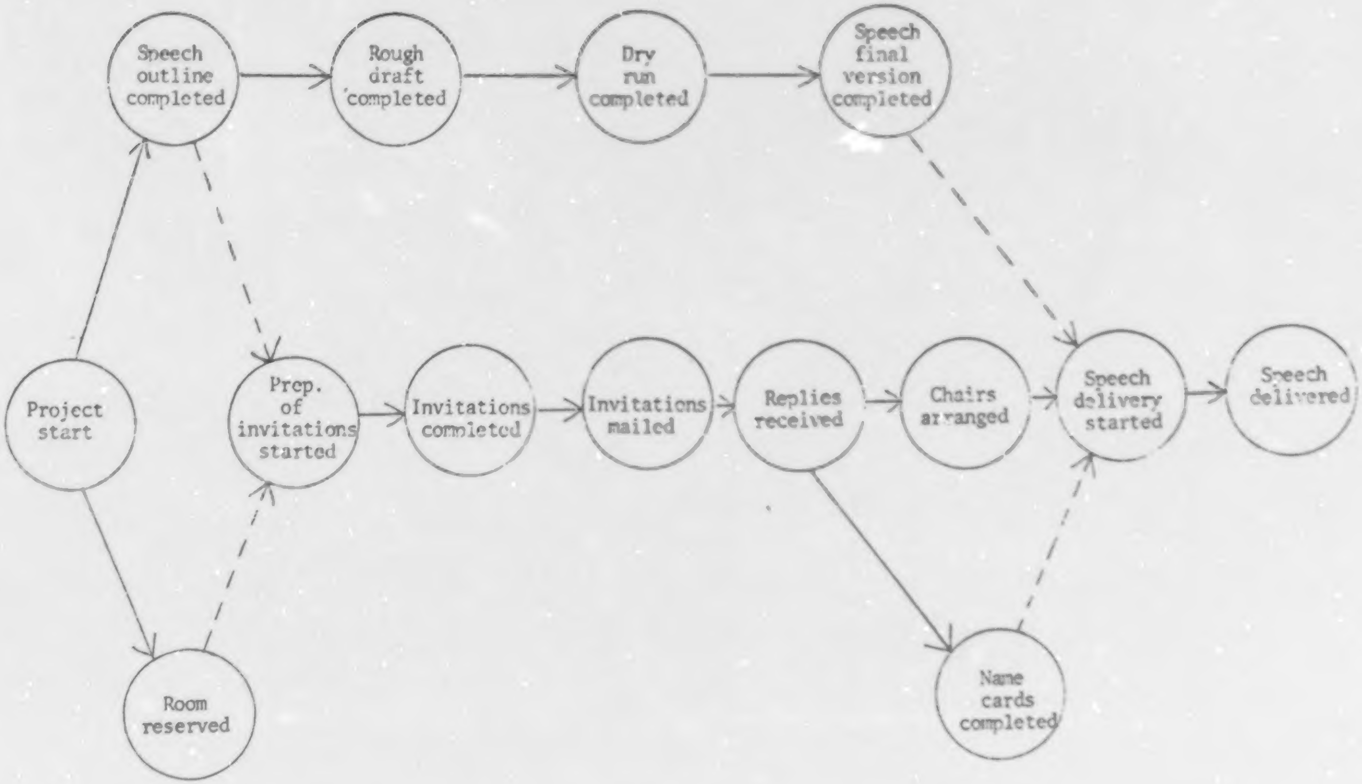
It is the usual practice in the Counselors' Association meetings to send out invitations to all members giving details of the time and place as well as an outline of the subject. Chairs must be arranged and name cards prepared, however, only for those members who send replies. The meetings are usually held in a small room at the Avondale Smorgasbord for which a reservation must be made early.

Not having given a speech before, you decide the best procedure is to prepare the speech in detail, dry-run it so that you can time it and have your wife criticize it, and then prepare the final version.

Since you have just completed the lesson in the EPMIS Module 2 on work flow, you feel that this is an excellent chance to try out your new-found skills and therefore decide to draw an event-oriented network of the jobs you have to do between now and the delivery of the speech. A suggested possible work flow for such a situation is provided on the next page.

Lesson 3--Developing a Work Flow

Additional Example A, continued


Speech outline completed
Rough draft completed
Dry run completed
Speech final version completed
Project start
Prep. of invitations started
Invitations completed
Invitations mailed
Replies received
Chairs arranged
Speech delivery started
Speech delivered
Room reserved
Name cards completed

Lesson 3--Developing a Work Flow

Additional Example B

General Situation

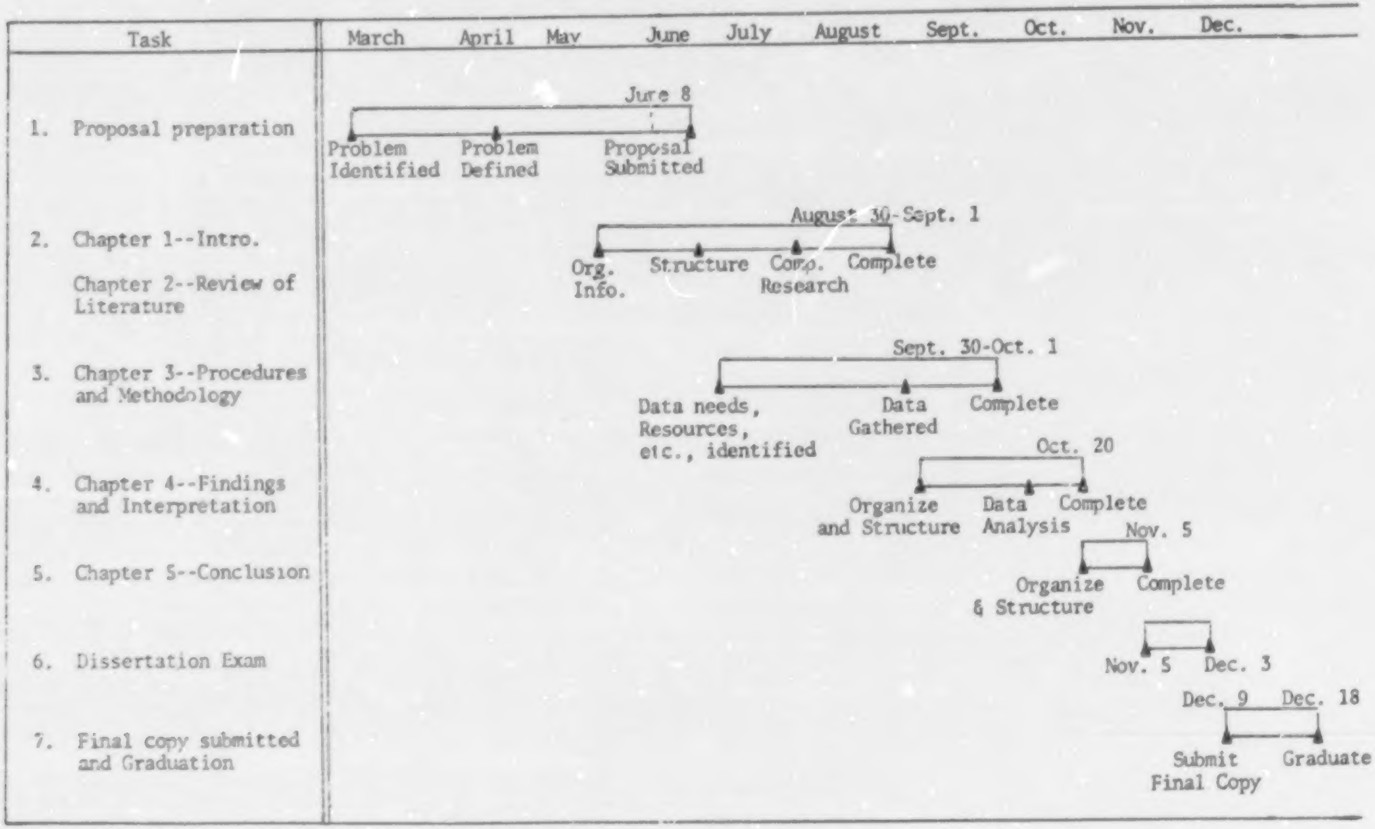
The Metropolitan School District encourages its administrators and teachers to secure advanced degrees. Bill Jones, a principal at one of the junior high schools, has been doing work toward a doctorate. He has finished his general examinations and started to work on his thesis.

Because of a limited time available to do all of the work, a desire to make sure that the work moves along smoothly, and that all necessary work gets accomplished, he has decided to view this situation as one like a project. Since the project was not too complicated, he chose to not do a project definition as such but did elect to develop a work flow. Feeling that a network approach was not really needed, Bill elected to use a bar chart or, as it is more formally known in management circles, a Gantt Chart approach.

The bar chart developed for the work flow in connection with his thesis is shown on the next page. As you examine the chart, note its general similarity to the network approach, but note also that the task interrelations and dependency are not clearly shown by this method. On the other hand, tasks can be shown to be carried out concurrently or in an overlapping manner just as in the network approach.

Lesson 3--Developing a Work Flow

Additional Example B, continued



Lesson 3--Developing a Work Flow

Reading References

Additional knowledge about the principles and procedures of work flow development and representation can be obtained by reading from the references cited below.

Archibald, R. D. and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, 1967, Chapters 1, 3, and Appendix C.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 2 and Appendix B-1, pp. 165-172.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 6.

Cook, Desmond L. PERT: Applications in Education. U. S. Office of Education Monograph, No. 17, Government Printing Office, Washington, D. C., 1966, Chapter 2.

Woodgate, H. S. Planning by Network (2nd edition). New York: Brandon Systems Press, 1967, Chapters 1, 2, 3, and 4.

Lesson 3--Developing a Work Flow

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 3--Developing a Work Flow

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on developing a work flow is now completed. Lesson 4 entitled "Time Estimation" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory page.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 4 -- Time Estimation

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 4--Time Estimation

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson 4.1
Overview and objectives 4.2
Pretest. 4.3
Lesson abstract and content outline. 4.5
Lesson text. 4.8
Exercises on time estimation 4.15
Post-Test. 4.20
Additional examples. 4.22
Reading references 4.26
Lesson Quality Control Form 4.27

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 4--Time Estimation."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 4--Time Estimation."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 12 minutes, the exercises take approximately 20 minutes. About 60 minutes is needed to complete the entire lesson.

Lesson 4--Time Estimation

Overview and Objectives

OVERVIEW

The previous lesson discussed the logical arrangement of various project tasks into a work flow. Consideration was given to different types of work flow diagrams and methods of constructing them.

This lesson concerns the methods of determining the time required for various tasks and the total project itself based on the tasks that must be accomplished. Different methods of determining time estimates are presented.

OBJECTIVES

The student in completing this lesson should be able to create a time estimate for a given work flow for a project. The specific objectives of the lesson are as follows:

1. The student should be able to determine the time that will most likely be needed for completing a given task.

2. The student should be able to calculate the critical path for a project given a work flow and time estimates for the various tasks.

Read the directions for the pretest on the following page.

Lesson 4--Time Estimation

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated____________________.

1. What is meant by process of "time estimation?"

   A. Determining the length of time needed for completion of the project
   B. Adjusting the times required for completing individual tasks and the total project
   C. Estimating personnel and time required to complete project tasks
   D. Determining the length of time needed to accomplish individual project tasks and the total project

2. Deterministic time estimates are made for tasks of what type?

   A. Repetitive
   B. Unique
   C. Once-through
   D. Uncertain

3. What are the names of the multiple time estimates used when employing probabilistic time estimating procedures?

   A. Expected and pessimistic times
   B. Expected and most likely times
   C. Optimistic and pessimistic times
   D. Optimistic, most likely and pessimistic times

4. What is the generally recommended time unit for individual task time estimates?

   A. Days
   B. Biweeks and months
   C. Weeks and tenths of weeks
   D. Hours

5. Why should tasks be selected at random from tasks in the work flow when making time estimates?

   A. To avoid placing a biased estimate on the later tasks
   B. To save time during time estimation
   C. To allow many people to help in the time estimation process without refering to the work flow
   D. To avoid confusion with the constraints and interdependencies represented in the work flow.

6. What is the basic project element to which time estimates are assigned?

   A. Critical path
   B. Activity
   C. Event
   D. Milestone

7. What is the basis generally used to determine the total project time?

   A. Critical path
   B. All individual task times
   C. Work flow diagram
   D. Milestone event times

8. Where are the activity or task times normally placed on the work flow diagram?

   A. Along the activities of the diagram
   B. Along the milestone events of the diagram
   C. Along the critical path of the diagram
   D. Along the events of the diagram

9. What is meant by the project critical path?

   A. The average time for all project pathways
   B. The shortest time consuming path of work flow
   C. The longest time consuming path of work flow
   D. The work flow path with the most amount of slack

10. Who should be involved in estimating task times?

   A. Project director and funding agency
   B. Project staff knowledgeable about the task
   C. All professional staff in the project
   D. Only project supervisors

Indicate whether the statements listed below are true or false by writing a T or F on the line.

11. _____ The total project time is based upon the time required for the orderly accomplishment of key tasks in the project.

12. _____ Probabilistic time estimates are made for tasks which are repetitive.

13. _____ The time to perform a task in time estimation is a function of the nature of the task.

14. _____ The time to accomplish a task is affected by the rate of expenditure of resources.

15. _____ The most likely or expected time is placed on the work flow diagram below the corresponding tasks in time estimation.

Turn the page and check your answers.

Lesson 4--Time Estimation

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 4 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the time estimation process and should read the lesson abstract and content outline on pages 4.5 and 4.6. Then begin the tape-slide presentation by turning to the instruction on page 4.7.

If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the time estimation process and should read the lesson abstract and content outline on pages 4.5 and 4.6. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 4.15. If you do desire to view the tape-slide presentation, turn to the instructions on page 4.7.

Multiple Choice

1. D
2. A
3. D
4. C
5. A
6. B
7. C
8. A
9. C
10. B

True/False

11. F
12. F
13. T
14. T
15. F

Lesson 4--Time Estimation

Lesson Abstract and Content Outline

ABSTRACT

Time estimation is an attempt to determine the length of time needed by a skilled person to accomplish the task assuming availability of equipment and resources. The time estimation is the amount of time it takes to complete the tasks, especially the longest time path of the work flow, called the critical path. Time estimation utilizes units of time (e.g., weeks, days, etc.) and includes the most likely, pessimistic, and optimistic times needed to complete the project.

CONTENT OUTLINE

A. Time estimations are made for each of the tasks of a project and for the total project time.
   1. Work packages from the project definition are used.
   2. The work flow diagram is used for total project time estimation.
   3. Manpower manuals on work efficiency and standard tasks are used.

B. There are two basic types of time estimations.
   1. Deterministic time estimates are used when fairly precise estimates are made based upon considerable information available from the same tasks done previously.
   2. Probabilistic time estimates are used when little information is available. Low, high, and middle estimates are made using similar tasks performed previously.

C. Time estimates vary, depending upon:
   1. The nature of the task itself,
   2. The degree of performance required in the task, and
   3. The rate of resource expenditure allowed for the task.

D. Skilled persons are assigned roles in relation to their skills and the work of the tasks.

E. Skilled persons assist in estimating time for the tasks by making estimates and by evaluating estimates made by others.

F. There are specific procedures in making time estimations.

1. Weeks and tenths of weeks is the typical time unit.

2. Tasks are selected at random when making time estimations to avoid bias estimates.

3. The people who are likely to be performing the specific tasks should be involved but without making work assignments so as to avoid "padding" of the estimate.

4. A maximum total project time is calculated by adding all task times serially.

5. After task times are written into the work flow diagram, a most likely project time is determined by adding the task times along various paths. The most time-consuming path is called the "critical path" and its time value is usually used for total project time estimate.

Lesson 4--Time Estimation

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray for this lesson onto the projector and advance the tray to the start of "Basic Principles and Techniques of Project Management, Lesson 4--Time Estimation."*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 4--Time Estimation

Lesson Text

Introduction

After developing the work flow, the next step in project planning is the development of time estimates for individual project tasks and for the total project. In order to make these time estimates, the type and extent of work required for the accomplishment of each task must be determined. These individual tasks or work packages specify a certain amount of work. The particular work involved is matched with the equipment, materials and personnel needed to accomplish the specified work. Task time estimation is an attempt to determine the length of time needed to accomplish an individual task using the equipment, materials, and personnel assigned to the task. The total project time is a function of the time required for the orderly accomplishment of the specified tasks in the project.

Nature of Time Estimating

Time estimates fall into two classes--deterministic and probabilistic.

Deterministic time estimations are those estimates which can be derived with considerable accuracy, because the project staff has available to it information from previous projects on how long a particular job will take. In such instances greater confidence and certainty can be placed on the time estimates, and generally a single time estimate for these tasks is sufficient.

Probabilistic time estimates are those estimates which cannot be determined with accuracy, because little or no information is available on the probable duration of the task. Tasks which are unique to the project staff fall into this category. The approach in this case is to make some reasonable estimate based upon the knowledge of the task. Generally, multiple estimates for these tasks are obtained. It is likely within a project that both deterministic and probabilistic time estimates will be required.

Some important aspects of time estimation in general need to be considered.

First, the time to perform a task is a function of the nature of the task. That is, some tasks are more difficult than others and require more time.

Second, the level of performance specified for a task affects the time required. For example, if the task is to provide a typewritten copy where no erasures or corrections are permitted, then the time is greater than when the copy is to be a rough draft for discussion purposes only.

Third, the time to accomplish a task is affected by the rate of expenditure of resources. If the emphasis is upon rapid completion of the task, many people might be assigned to work simultaneously. If the emphasis is on economy, then limited resources would be made available. For example one person might be assigned to work on the task during idle time.

Fourth, the time to accomplish a task is dependent upon the various job roles required for its accomplishment. Some of the job roles for educational projects are subject area instructors or specialists, evaluators, researchers, statisticians, secretaries, typists, and clerks. The rate of work and the performance expectations of these job roles must be considered.

Time Estimating Process

The process of time estimation involves both the estimate of the time required to complete individual tasks and the time required to complete the entire project effort. These two different processes are treated separately below.

Estimating Task Times: In determining the time required for each task, a deterministic time or a probabilistic time procedure can be used. In the latter case, the estimator should consider using multiple estimates: an optimistic, a most likely, and a pessimistic time. If he can find a somewhat similar task in a previous project where things went well, he can use the reported time as the optimistic time. Likewise, he can obtain a pessimistic time estimate by finding a similar task where everything went wrong. The most likely time is the time the task would take under normal conditions. The project manager might want to use Program Evaluation and Review Technique (PERT) for both task and total project time estimation. This procedure involves making pessimistic, most likely, and optimistic time estimates and inserting them into formulas to obtain an "expected" time for the completion of each task and the total project. Regardless of whether three time estimates or a single time estimate are secured, the most likely or expected time is placed on the work flow diagram above the corresponding tasks.

The time estimates can be made in various kinds of units. The recommended units are weeks or tenths of weeks. Note that a tenth of a week is one-half of a day. When making time estimates for the various tasks, one should select tasks at random rather than following a sequential or left to right order of the tasks in the work flow. This helps to avoid biasing an estimate on the later tasks by considering the time estimates assigned to earlier project tasks.

It is highly recommended that the people who will eventually perform the tasks, or are knowledgeable about the tasks, be involved in deriving task times. These people are more aware of potential pitfalls and, as a result of their involvement, are more likely to have some attachment to the task in the event they are eventually assigned to it. The project manager must be alert to the tendency of people to pad time estimates in order to provide self-protection. Consequently, the actual assignment of personnel to each task should not be made until time estimation has been completed. The use of potential project people should be clearly defined as assistance for the purpose of time estimation and not be defined as task assignment.

Estimating Project Time. When all tasks of a project have an estimated time for completion, a total or overall project time is computed. There are a number of methods for obtaining a total project time estimate. One method is to merely add the times for each task assuming that all tasks are completed in a linear sequence one at a time. Few if any projects, however, are done as a sequence of tasks one at a time. Therefore, the actual project time will surely be less than this estimate.

A second method is to use the work flow diagram with the task times placed along the activities of the diagram. The task times along all possible paths through the work flow are added. The most time-consuming path gives a total project time called the critical path time. This time is the time for the completion of the project if the resources allocated are sufficient to allow indicated parallel activities to be performed simultaneously. The sum of task times which fall along the longest, or critical, path in the work flow diagram is recommended as the best estimate of the total project time.

Because of an imposed constraint, such as a school year requirement or a specific date imposed upon the project manager from outside the project, the actual total project time may have to be adjusted from the originally estimated time. The alternatives available to the project manager in solving this problem are to conduct more activities in parallel, reallocate resources, obtain additional resources, change the scope or performance specifications of the project activities, or eliminate some activities.

Time Estimation Example

Let us now look at an example of time estimation. Bridgetown School has a project to plan the second semester adult education program. One work package is described as developing and reproducing the course offering and sign-up form. The previous task of determining the courses to be offered has been completed. In estimating a time for this work package, the project manager might first seek someone who has designed a similar form and had it printed. The time estimates from this previous project would then be used to help estimate times. If previous experience could not be obtained, the project manager would have to use his best judgment in estimating how long it would take to write, review and re-write a clear form letter of about the length required to convey the necessary information about the adult education program. He would also have to consider the time required for a few people to react to the form and the time necessary for typing and printing the required number of copies of the final version. The project manager would then add these times to obtain a time for the entire work package. This process of estimating the time for the completion of a work package is illustrated in Figure #1.

As was done with this one work package, the project manager and his staff would make time estimates for all the other work packages or tasks appearing in the project work flow diagram. These time estimates would then be placed above each task on the work flow. Next, the times along all the

1) Work Package/Task Description

Develop and reproduce the course offering and sign-up form.

2) List of Subtasks

Subtask A - Write draft

Subtask B - Review draft

Subtask C - Revise draft

Subtask D - Type final draft

Subtask E - Print final draft

3) Estimates of Subtask Times

Subtask E - 1 week

Subtask B - 2 weeks

Subtask D - 1 week

Subtask A - 2 weeks

Subtask C - 3 weeks

4) Summation of Subtask Times

Subtask A - 2 weeks

Subtask B - 2 weeks

Subtask C - 3 weeks

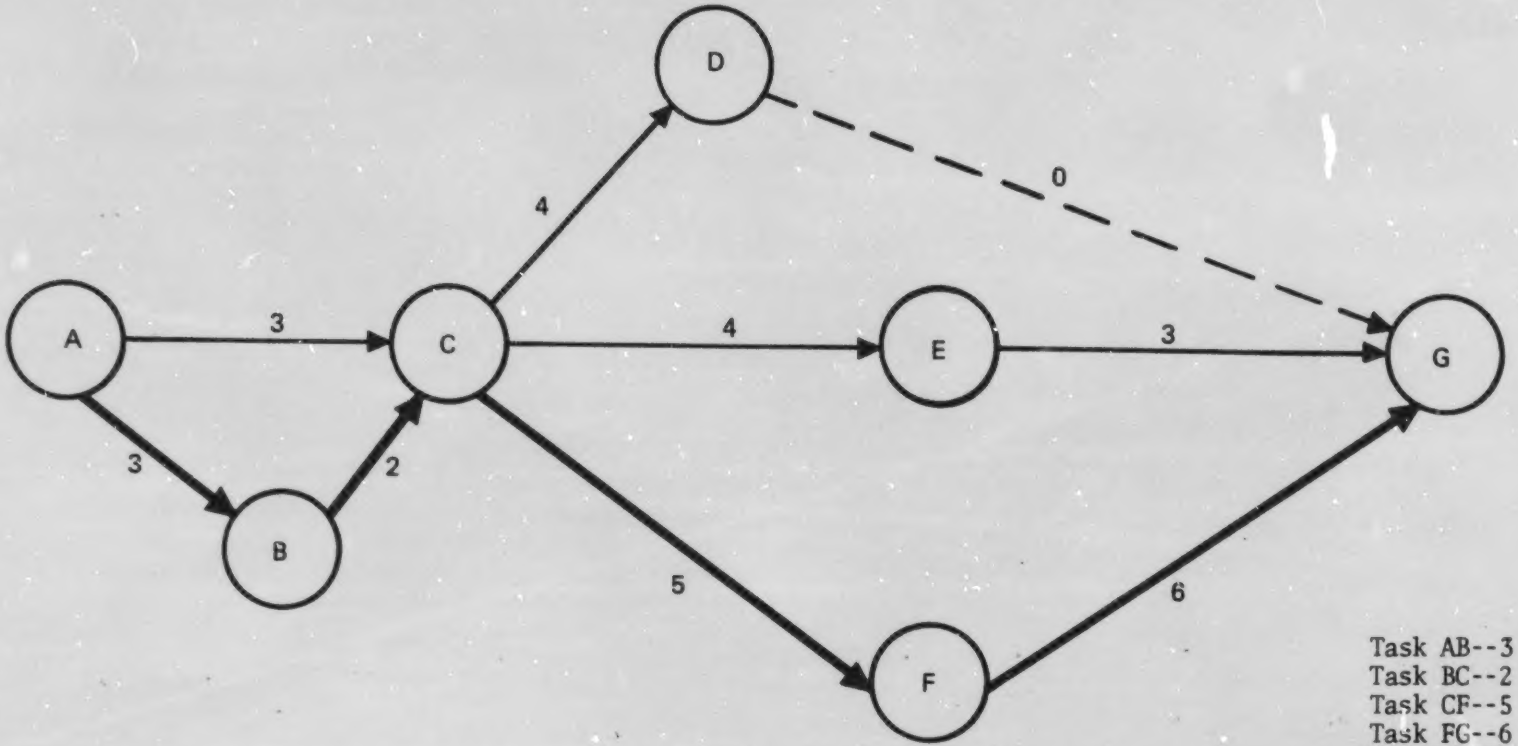
Subtask D - 1 week

Subtask E - 1 week

Total Time for Work Package 9 weeks

(Note: Summation for estimation of work package time assumes subtasks will be performed in a linear sequence. However, if any of these subtasks are performed in parallel or simultaneously the total time for package completion will be less than 9 weeks.)

Figure #1--Example of Process Sequence for Work Package Time Estimation



Task AB--3 weeks
Task BC--2 weeks
Task CF--5 weeks
Task FG--6 weeks

Total Project Time ---- 16 weeks

Longest time path through the project work flow diagram or network is A to B to C to F to G. Therefore, the best estimate of the total project time is this critical path time of 16 weeks.

Figure #2--Example of Project Time Estimation possible paths through the work flow would be computed. The longest "time path" would then be labeled the project critical path. The time along that path would be used as the best estimate of the total project time. This process of estimating the time for the completion of the total project effort is illustrated in Figure #2.

Summary

It is desirable that time estimates for project tasks be made by people who are familiar with the activities involved. In making these estimates it should be assumed that necessary resources will be available for the tasks. Tasks, however, can be completed faster with a high utilization of skilled persons and other resources or completed in a slower time with a low rate of resource utilization. A "best" task time is one which conserves resources and yet completes the task prior to the need for its end product by a subsequent task. Time estimates should be made in a time unit such as weeks or tenths of weeks. Most likely, pessimistic and optimistic time concepts may be employed if necessary.

Once time estimates have been made for all project work packages or tasks, these estimates should be placed on the project work flow diagram. The time required for completion of the project is then determined by summing times along various paths through the work flow. The time along the longest time path, called the critical path, is the time for the completion of the project.

Read the directions for Exercise A on the following page.

Lesson 4--Time Estimation

Exercise A

Directions: This exercise carries through with the inservice training workshop developed in the exercises in Lesson 3. In this exercise, you are to make estimates for the time needed to complete one of the tasks involved in running the workshop based on the information given. Calculate the likely time for completion of this task and express your answer in tenths of a week.

Task 9. Write objectives and script for each program presentation.

This task will involve getting together with the instructors and drafting the objectives and script for the presentation. It will probably take one day for the group to do this, after which time it can be given to the typist for typing. The group of instructors can then proofread the draft and make final corrections in about one afternoon.

The superintendent can then review the draft. Assuming you can get it to his office in the morning, he has promised to get the draft back to you with his comments by late the same day. You can then confer with the instructors to revise the objectives and submit them to the typist for final copy and for duplicating them so they can be distributed to the workshop participants. It will take the group about a day and a half to write the revised version. Parts of the objectives and script can be given to the typist during the last half day of the revising process. It will take her about one whole day to type the final copy for duplicating. The actual duplicating can be done in a half a day.

Estimated task time _________.

Turn the page and check your answers.

Lesson 4--Time Estimation

Exercise A--Solution

Directions: Given below is a suggested solution for Exercise A. Check your response against the answer given. Your answer should be within one-half day (i.e., one-tenth of a week) of the answer given. If you feel the need for additional instruction at this point, review the ideas contained in the lesson or check one of the options on page 4.19. After your review, move on to Exercise B on the next page. If you do not review, go right on to the next page.

Initial writing of objectives and script.	1 day	.2 weeks
Typing the initial draft.	1/2 day	.1 weeks
Instructors review of initial draft	1/2 day	.1 weeks
Superintendent's review of draft.	1 day	.2 weeks
Instructors' revision of objectives and script. . .	1 1/2 day	.3 weeks
Typists' final typing of objectives and script. . .	1 day	.2 weeks
Duplicating the final copy.	1/2 day	.1 weeks

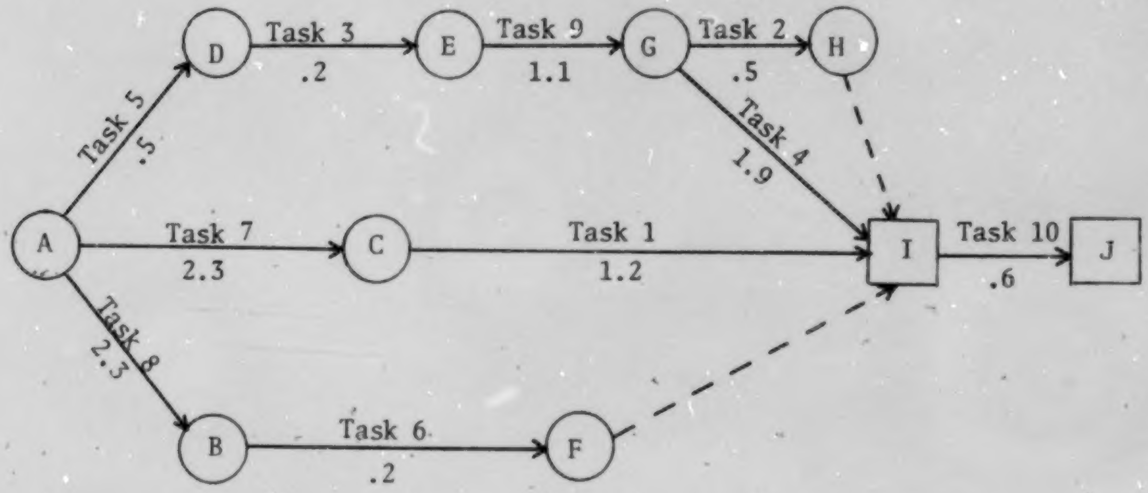
This appears to total to 1.2 weeks. However, remember that the instructors' revision of the final copy of the objectives and the final typing of the objectives overlap by half a day (i.e., .1 weeks). This is because the objectives and script are being given to her for typing as they are completed. Therefore, the total for the entire task should be 1.1 weeks.

Lesson 4--Time Estimation

Exercise B

Directions: Reprinted below is the flow chart for the activities involved in conducting the workshop. Printed below each activity is an estimate of the most likely time it will take to complete each activity, expressed in tenths of a week.

You are to find the critical path of the project and the time length of this path.


A
D
Task 5
.5
Task 3
.2
E
Task 9
1.1
G
Task 2
.5
H
Task 4
1.9
Task 7
2.3
C
Task 1
1.2
I
Task 10
.6
J
Task 8
2.3
B
Task 6
.2
F

A. Project Start
B. Staff Survey Complete
C. Retreat Location Complete
D. Program Plan Complete
E. Teaching Assignments Complete
F. Participant Selection Complete
G. Objectives Complete
H. Pre/Post-Tests Complete
I. Staff Workshop
J. End Workshop

LEGEND

☐ = Milestone Event
→ = Activity
- - - - = Constraints (Dummy Activity)

Turn the page and check your answer.

Lesson 4--Time Estimation

Exercise B--Solution

Directions: Given below is the solution to Exercise B. Your solution should not deviate from it. After you have checked your answer, proceed to the next page.

Finding the critical path. The critical path is the most time-consuming path in the project. If you added the times along all possible paths in the flow chart from "Start" to "End Workshop", you would have found the longest path to be along Tasks 5, 3, 9, and 4. No other path is as long.

Finding the total time for the project. The total time for the project is the total time along the critical path. The total time along the path of Tasks 5, 3, 9, and 4 is 4.3 weeks.

While it is not part of the exercise, you might want to consider how you would reduce the total time of 4.3 weeks if given only 4 weeks to complete the project. Would you speed up work rates for some task? Reduce quality standards for the end-product? Devote less time to some task? Or some other solution?

Lesson 4--Time Estimation

Directions and Choices Following the Practice Exercise

Based upon a self-evaluation of your performance on the two exercises in this lesson, you have either:

A. *acceptably satisfied the objectives of estimating time for a project and should now turn to the post-test found on page 4.20.*

B. *not satisfied the objectives. If so, you should select one or more of the following courses of action.*

   1. *Study the additional examples beginning on page 4.22 and then rework Exercises A and B beginning on page 4.15.*
   2. *Read Chapter 7 of* Educational Project Management *by Desmond L. Cook and then rework Exercises A and B beginning on page 4.15.*
   3. *View the slide-tape presentation again; instructions are on page 4.7 . After the presentation, rework Exercises A and B beginning on page 4.15.*
   4. *Read the lesson narrative beginning on page 4.8. Then, rework exercises A and B beginning on page 4.15.*
   5. *Rework Exercises A and B beginning on page 4.15.*

Lesson 4--Time Estimation

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated____________.

1. Why should tasks be selected at random from tasks in the work flow when making time estimates?

   A. To avoid placing a biased estimate on the later tasks
   B. To save time during time estimation
   C. To allow many people to help in the time estimation process without refering to the work flow.
   D. To avoid confusion with the constraints and interdependencies represented in the work flow.

2. What are the names of the multiple time estimates used when employing probabilistic time estimating procedures?

   A. Expected and pessimistic times
   B. Expected and most likely times
   C. Optimistic and pessimistic times
   D. Optimistic, most likely and pessimistic times

3. What is the generally recommended time unit for individual task time estimates?

   A. Days
   B. Biweeks and months
   C. Weeks and tenths of weeks
   D. Hours

4. Deterministic time estimates are made for tasks of what type?

   A. Repetitive
   B. Unique
   C. Once-through
   D. Uncertain

5. What is meant by process of "time estimation?"

   A. Determining the length of time needed for completion of the project
   B. Adjusting the times required for completing individual tasks and the total project
   C. Estimating personnel and time required to complete project tasks
   D. Determining the length of time needed to accomplish individual project tasks and the total project

6. Where are the activity or task times normally placed on the work flow diagram?

   A. Along the activities of the diagram
   B. Along the milestone events of the diagram
   C. Along the critical paths of the diagram
   D. Along the events of the diagram

7. What is meant by the project critical path?

   A. The average time for all project pathways
   B. The shortest time consuming path of work flow
   C. The longest time consuming path of work flow
   D. The work flow path with the most amount of slack

8. Who should be involved in estimating task times?

   A. Project director and funding agency
   B. Project staff knowledgeable about the task
   C. All professional staff in the project
   D. Only project supervisors

9. What is the basis generally used to determine the total project time?

   A. Critical path
   B. All individual task times
   C. Work flow diagram
   D. Milestone event times

10. What is the basic project element to which time estimates are assigned?

   A. Critical path
   B. Activity
   C. Event
   D. Milestone

Indicate whether the statements listed below are true or false by writing a T or F on the line.

11. _____ The time to perform a task in time estimation is a function of the nature of the task.

12. _____ The most likely or expected time is placed on the work flow diagram below the corresponding tasks in time estimation.

13. _____ Probabilistic time estimates are made for tasks which are repetitive.

14. _____ The total project time is based upon the time required for the orderly accomplishment of key tasks in the project.

15. _____ The time to accomplish a task is affected by the rate of expenditure of resources.

Turn the page and check your answers.

Lesson 4--Time Estimation

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 4 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the time estimation process and should select one or more of the following courses of action.

1. *View the slide-tape presentation by turning to page 4.7 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 4.27.*
2. *Read the lesson narrative beginning on page 4.8. Then, turn to the Lesson Quality Control Form on page 4.27.*
3. *Read Chapter 7 of* Educational Project Management *by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 4.27.*
4. *Study the additional examples beginning on page 4.22 and then turn to the Lesson Quality Control Form on page 4.27.*
5. *Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 4.27.*

If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of time estimation and should now turn to the Lesson Quality Control Form on page 4.27. Additional examples on estimating time are found on page 4.22. References for additional reading are listed on page 4.26.

Multiple Choice

1. A
2. D
3. C
4. A
5. D
6. A
7. C
8. B
9. C
10. B

True/False

11. T
12. F
13. F
14. F
15. T

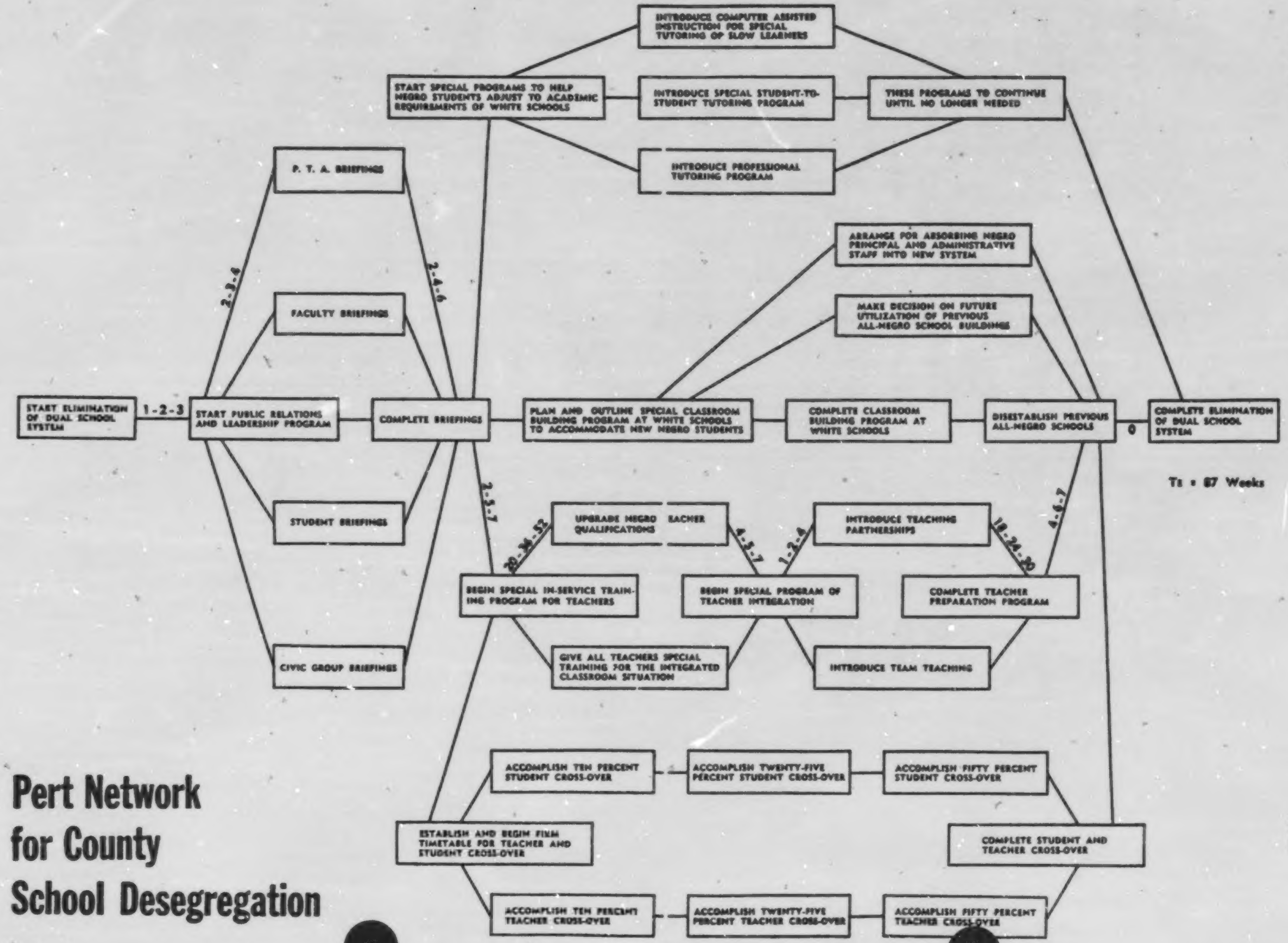
Lesson 4--Time Estimation

Additional Example A

A school district in a southern state decided to implement a school desegregation plan for its system. The district had been maintaining a dual school system, one for Negroes and another for whites. The plan included such activities as building additions to white schools to accommodate the increase in enrollment since the Negroes were all to be transferred to white schools and the Negro schools disestablished. It was also necessary to bring various local groups into the plan so they could be oriented to what would happen, to integrate the teaching and administrative staffs, and various other activities.

Since the school district had no previous experience to guide them in the preparation of a timetable for such a project, it was decided to use a PERT network to show the flow for the various tasks and to use probabilistic time estimates to determine the times involved in the implementation of the desegregation plan.

The flow chart for the plan is reproduced on the following page. The time estimates are shown in weeks and only the times along the critical path are given. For each activity, an optimistic, expected, and pessimistic time is shown. For example, for the activity labeled "Complete Teacher Preparation Program" the times given are 18-24-30, indicating that an optimistic time is 18 weeks, the expected time is 24 weeks, and the pessimistic time is 30 weeks for completion of the activity. The total expected time for the project is 87 weeks.


INTRODUCE COMPUTER ASSISTED INSTRUCTION FOR SPECIAL TUTORING OF SLOW LEARNERS
START SPECIAL PROGRAMS TO HELP NEGRO STUDENTS ADJUST TO ACADEMIC REQUIREMENTS OF WHITE SCHOOLS
INTRODUCE SPECIAL STUDENT-TO-STUDENT TUTORING PROGRAM
THESE PROGRAMS TO CONTINUE UNTIL NO LONGER NEEDED
INTRODUCE PROFESSIONAL TUTORING PROGRAM
P. T. A. BRIEFINGS
2-3-4
2-4-6
FACULTY BRIEFINGS
ARRANGE FOR ABSORBING NEGRO PRINCIPAL AND ADMINISTRATIVE STAFF INTO NEW SYSTEM
MAKE DECISION ON FUTURE UTILIZATION OF PREVIOUS ALL-NEGRO SCHOOL BUILDINGS
START ELIMINATION OF DUAL SCHOOL SYSTEM
1-2-3
START PUBLIC RELATIONS AND LEADERSHIP PROGRAM
COMPLETE BRIEFINGS
PLAN AND OUTLINE SPECIAL CLASSROOM BUILDING PROGRAM AT WHITE SCHOOLS TO ACCOMMODATE NEW NEGRO STUDENTS
COMPLETE CLASSROOM BUILDING PROGRAM AT WHITE SCHOOLS
DISESTABLISH PREVIOUS ALL-NEGRO SCHOOLS
0
COMPLETE ELIMINATION OF DUAL SCHOOL SYSTEM
TE = 87 Weeks
2-5-7
STUDENT BRIEFINGS
UPGRADE NEGRO TEACHER QUALIFICATIONS
20-36-52
4-5-7
1-2-4
INTRODUCE TEACHING PARTNERSHIPS
18-24-30
4-6-7
BEGIN SPECIAL IN-SERVICE TRAINING PROGRAM FOR TEACHERS
BEGIN SPECIAL PROGRAM OF TEACHER INTEGRATION
COMPLETE TEACHER PREPARATION PROGRAM
CIVIC GROUP BRIEFINGS
GIVE ALL TEACHERS SPECIAL TRAINING FOR THE INTEGRATED CLASSROOM SITUATION
INTRODUCE TEAM TEACHING
ACCOMPLISH TEN PERCENT STUDENT CROSS-OVER
ACCOMPLISH TWENTY-FIVE PERCENT STUDENT CROSS-OVER
ACCOMPLISH FIFTY PERCENT STUDENT CROSS-OVER
ESTABLISH AND BEGIN FIRM TIMETABLE FOR TEACHER AND STUDENT CROSS-OVER
COMPLETE STUDENT AND TEACHER CROSS-OVER
ACCOMPLISH TEN PERCENT TEACHER CROSS-OVER
ACCOMPLISH TWENTY-FIVE PERCENT TEACHER CROSS-OVER
ACCOMPLISH FIFTY PERCENT TEACHER CROSS-OVER

**Pert Network
for County
School Desegregation**

Lesson 4--Time Estimation

Additional Example B

The Midville School System is endeavoring to gather information regarding the attitudes of local citizens towards local issues of concern to the schools. George Smith, an administrator in the school system's Planning Office has been given the task of making the survey.

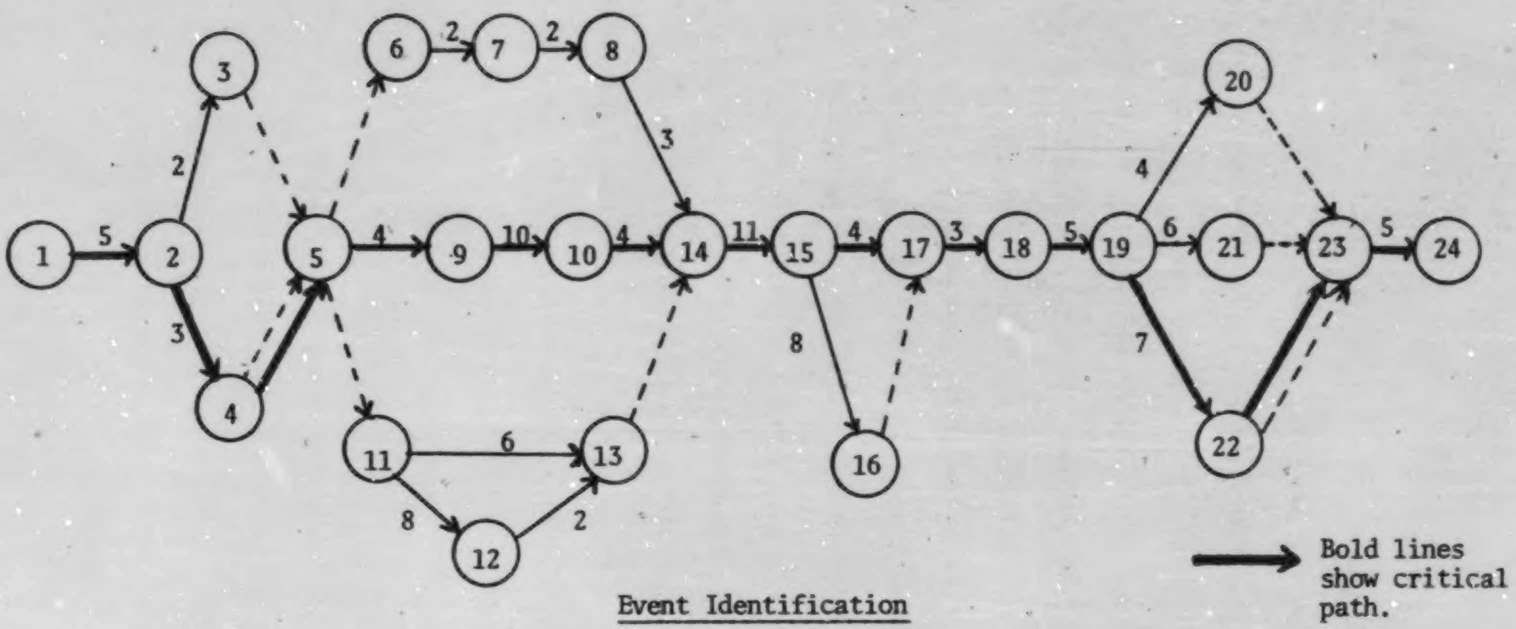
In reviewing the surveys which had been taken in the past, he found that previous efforts to gather information by such a survey method had neglected to establish adequate hypotheses and to give proper consideration as to why the study is being conducted and how the data is to be analyzed. He decided to make this part of his planning for the survey project and, once this was done, to draw up his design for collecting this information, analyzing the data, and reporting it.

After determining the work breakdown structure for his project, he placed the various tasks into a flow chart and then assigned times to the various tasks. Since he had previous experience in making such surveys, he was fairly certain as to the time which would be required in carrying out the tasks. Therefore, he made only one time estimate for each activity. His flow chart, with the times he assigned (expressed in days) is on the next page.

After looking at the times which he placed on the chart, he found that the critical path was along tasks 1, 2, 4, 5, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 24. The critical path totaled to 61 days. With five working days per week, this meant that slightly over 12 weeks would be needed to complete the project.

Lesson 4--Time Estimation

Additional Example B


1
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9
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18
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20
21
22
23
24
5
2
3
4
2
2
3
10
4
11
4
3
5
6
5
4
7
8
6
8
2
Bold lines show critical path.

Event Identification

1. Start Project
2. Complete Objective
3. Complete Data Paradigm
4. Complete Hypotheses
5. Start Item Construction
6. Start Universe Definition
7. Start Sampling
8. Start Sample Selection
9. Start Tryout
10. Start Final Form
11. Start Interviewer Selection
12. Complete Administrative Procedures
13. Complete Schedules
14. Start Field Interview
15. Start Data Coding
16. Complete Follow-up
17. Start Tabulation
18. Start Statistical Tests
19. Complete Tests
20. Complete Interpretation
21. Complete Tables
22. Complete Charts
23. Start Narrative
24. Complete Narrative

Chart derived from Desmond L. Cook, Program Evaluation and Review Technique: Applications in Education, U. S. Office of Education Monograph No. 17, Government Printing Office, Washington, D. C., 1966, page 43.

Lesson 4--Time Estimation

Reading References

Additional knowledge about the principles and procedures of time estimation can be obtained by reading from the references below:

Archibald, R. D. and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, 1967, Chapter 3 and 4.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 2, 3, and Appendix B-1.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 7.

Woodgate, H. S. Planning by Network. New York: Brandon Systems Press, 1967, Chapter 5 and 6.

Lesson 4--Time Estimation

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 4--Time Estimation

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on time estimation is now completed. Lesson 5 entitled "Resource Estimation and Scheduling" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory page.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 5 -- Resource Estimation and Scheduling

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 5--Resource Estimation and Scheduling

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson. 5.1
Overview and objectives 5.2
Pretest 5.4
Lesson abstract and content outline 5.7
Lesson text 5.11
Exercise on resource estimation 5.20
Post-test 5.28
Additional examples 5.30
Reading references. 5.35
Lesson Quality Control Form 5.36

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 5--Resource Estimation and Scheduling."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 5--Resource Estimation and Scheduling."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen
small ruler or straight edge

TIME REQUIRED. The tape-slide presentation runs approximately 12 the exercise takes approximately 30 minutes, and about 50 minutes is needed to complete the entire lesson.

Lesson 5--Resource Estimation and Scheduling

Overview and Objectives

OVERVIEW

Up to this point in the lesson sequence, you have been exposed to steps in the planning phase which focused upon objectives setting, work delineation, the sequencing of tasks, and deriving estimates of the time to do each task and the total project. The successful completion of any project depends on the amount and type of resources made available to the effort and/or requested to support the various project tasks. This lesson introduces you to the concept of resource estimation or determination. It is the last step prior to establishing the budget or cost estimate for the project which is the subject of the lesson following this one.

OBJECTIVES

Upon completing this lesson, the student should be able to establish for a given project the types and amounts of resources (personnel, materials, services, travel, communications, and so on) needed to complete the proposed scope of work. The specific objectives of the lesson are as follows:

1. The student should be able to estimate the resources necessary for accomplishment of each given task by detailing the resources under a list of specialized headings.

2. The student should be able to construct or create a task-event calendar given: (a) a project or task start date, (b) work flow diagram, (c) estimated task times, and (d) overall project time.

3. The student would be able to combine the given task resources with a project task-event calendar using nominal or color coding for given resource items.

4. The student should be able to adjust the tasks which have an associated slack so as to achieve a uniform rate or level of resource utilization given: (a) a project task-event-resource calendar, and (b) a work flow chart.

5. The student should be able to establish a resource commonality table to exclude common resource items from the list of resources included on a given calendar.

6. The student should be able to calculate or establish the lead time required for the acquisitions of each type of needed resource.

Complete the pretest on the following page.

Lesson 5--Resource Estimation

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated _______________.

1. Resource estimation is concerned with what action or activity?

   A. Determining the type and quantity of resources needed for each project task and the total project
   B. Estimating the lead time for project resources
   C. Estimating the cost to the organization for project space, facilities, and resources
   D. Developing schedules for resource utilization

2. What purpose can resource estimation serve in the project definition process?

   A. Examine the resources required for the completion of individual tasks
   B. Specify calendar dates for the acquisition of project equipment and other resources
   C. Translate plan into a time-table
   D. Determine what resources are important to the project

3. What is generally considered to be the most expensive project resource?

   A. Equipment
   B. Facilities
   C. Computer services
   D. Personnel

4. What is the common denominator to which all resource items are converted for purposes of control?

   A. Personnel codes
   B. Dollars
   C. Man hours
   D. Calendar dates

5. Scheduling or the translation of the project plan into a time-table is done for what purpose?

   A. To allocate resources to the various tasks over time
   B. To identify the limits and constraints important to the project
   C. To insure the successful completion of the project
   D. To show specific calendar dates for the start and completion of work

6. What important criteria are generally considered while maintaining application of resources in developing the project schedule?

   A. Completing the project in the maximum time with minimum cost
   B. Completing the project to the maximum satisfaction of higher authorities
   C. Completing the project within minimum time and cost with maximum performance
   D. Completing the project within ideal schedule with limited constraints

7. Which one of the following, generally makes the process of project scheduling somewhat difficult?

   A. 12 months academic year
   B. More personnel available for short term employment
   C. More use of computers
   D. Lack of necessary resources

8. What purpose can a Gantt or bar chart serve in the resource estimation process?

   A. To visualize resources related to a few important tasks
   B. To present the task resource schedule
   C. To visualize the distribution of tasks and all resources over time
   D. To visualize resources related to project milestones

Indicate whether the statements listed below are true or false by writing a T or F on the line.

9. _____The project schedule places an emphasis upon the start and end of each activity.

10. _____The sequence of activities lying on the critical path of work flow should be indicated on the Gantt chart.

11. _____The degree of planning and control applied to each type of resource depends upon its size.

12. _____The bar graph helps to visualize the effect of task rescheduling upon the resource usage rate.

13. _____Resource estimating and scheduling involve scheduling the project tasks with school system working dates.

14. _____Resource estimating and scheduling involve reducing the project resource needs by rescheduling tasks.

Turn the page and check your answers.

Lesson 5--Resource Estimation and Scheduling

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 5 pretest are listed down the right margin; the left column is for the first page of the pretest, the right column is for the second page. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the resource estimation process and should read the lesson abstract and content outline beginning on page 5.7. Then begin the content presentation by turning to the instructions on page 5.10.

If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the resource estimation process and should read the lesson abstract and content outline on page 5.7. Then, if you desire to skip the content presentation, you may do so by proceeding directly to the practice exercise beginning on page 5.20. If you do desire to view the content presentation, turn to the instructions on page 5.10.

Multiple Choice

1. A
2. A
3. D
4. B
5. D
6. C
7. D
8. C

True/False

9. T
10. T
11. F
12. T
13. F
14. T

Lesson 5--Resource Estimation and Scheduling

Lesson Abstract and Content Outline

ABSTRACT

Resource estimation is the process of determining the various types or categories of resources needed to accomplish the various tasks or activities in the project. Resources are generally of four types--personnel, equipment and materials, services, and travel. Effective project management requires that the resources be allocated in such a manner to provide for a smooth flow of work. The use of modified bar charts provides a convenient way of not only determining resources needs for a particular task but also provides a means for efficient allocation. The process of project scheduling is highly related to the careful determination of resource needs and their proper allocation among the tasks during the course of the project.

CONTENT OUTLINE

A. Resource requirements for a project are determined by establishing the personnel, equipment, materials and services, and travel needed for each of the project tasks.

B. Project management deals with the complex problem of allocating, monitoring, and controlling various combinations of the resources to achieve the project goal.

C. Some considerations in the estimation and allocation of project resources are:

   1. Manpower or personnel problems are a major area of concern.

      a. Most expensive
      b. Requires time to acquire and train
      c. Trade-off exists between manpower and labor saving equipment
      d. Trade-off exists between rate of manpower usage and project time
      e. Shortage of excessive manpower level can cause difficulties

2. Questions which focus upon the level of performance required as compared to the cost associated with securing the desired level of performance.

3. The possibility of shared use of equipment and materials by a number of the tasks.

D. Scheduling is the process of allocating resources to the various tasks over time in order to insure calendar dates will be maintained.

1. Scheduling involves a translation of the plan into a timetable identifying the start and completion time for each task.

2. Scheduling must consider constraints such as availability of people; the nine-month school year; and local, state, and federal guidelines.

3. A schedule is deemed best when it provides for completing the project with specified criteria. Some criteria are as follows:

   a. Minimum time
   b. Minimum cost
   c. Maximum performance

4. The most typical case is a need to schedule with limited resources rather than with maximum resources.

5. A bar or Gantt chart is a visual schedule plan where limited resources are allocated to the tasks.

6. A task-event-resource calendar is a modified Gantt chart which allows for several accomplishemnts.

   a. Tasks are scheduled in time.
   b. Resources to support each task are indicated using a code.
   c. Examination of resources needed over time (by counting resource items to be used each week) indicates the largest amount of each resource item required for each week of the project.
   d. Adjustments of tasks in time allows for most efficient use of resources where tasks share common resources.
   e. The efficient use of manpower is accomplished by shifting some tasks in time to permit a single skilled person to work on a number of tasks or to perform in more than one job role. This process is referred to as manpower or resource leveling.

7. Resource codes are used to permit the resource planner to utilize manpower leveling and to integrate or dovetail personnel, equipment and materials.

8. Resource codes can be a color code, number code, letter code, or any combination of these.

Turn the page for content presentation instructions.

Lesson 5--Resource Estimation and Scheduling

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the slide marked "Module 2--Basic Principles and Techniques of Project Management, Lesson 5--Resource Estimation and Scheduling."*
3. *Place the cassette tape labeled "Module 2--Basic Principles and Techniques of Project Management, Lesson 5--Resource Estimation and Scheduling" into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 5--Resource Estimation and Scheduling

Lesson Text

Introduction

The next step after time estimation in the project planning process is the combined operation of resource estimation and scheduling.

Resource estimation is the determination of the type and quantity of resources needed for the entire project by examining the resource needs of each task or work package outlined in the WBS. Resources in this context is considered to mean manpower, equipment, materials, specialized services or any other commodity which is expressible in physical form.

The utilization of resources has considerable influence upon project performance standards, the reformulation of plans, the estimation of activity times, the establishment of schedules, and the monitoring of project progress. Consequently, substantial management effort is often spent in determining resources and monitoring or controlling their use to achieve the project goal.

Nature of Resources

Resource estimation is a very important activity, because the amount and variety of resources purchased with project money may be very great. The basic unit of project operational control is money. Consequently, all of the physical or manpower resources are eventually expressed as dollar amounts in the budget and resource control documents. It is still necessary, however, to talk about the resources themselves.

Manpower is often the most expensive project resource. In addition, it is a notoriously inflexible resource due to the time required to recruit and train personnel. Manpower expenses can often be reduced by using labor-saving equipment such as computers, automatic typewriters, and reporducing machines.

Project time can often be shortened by increasing the manpower utilization rate, but much higher project costs are likely in this case. If, however, too much manpower is used, there is the likelihood of idle time.

Because of the expense involved, it is necessary to plan project work in a manner which keeps all personnel in continuous, profitable activity. If too little manpower is made available, work may be delayed. A manpower shortage not only causes delay, but it can also withhold input to subsequent operations which may have an adequate work force. The result is idle time and increased cost. Careful manpower resource planning is necessary in order to avoid these manpower problems.

Resource Planning

The primary questions that must be answered in project resource planning are: What? How much? When? and What are the alternatives? Before these questions can be answered it is necessary to review the performance level required for each task, as specified in the project definition or work breakdown structure.

The first step in resource estimation is to examine the resources required for the completion of the individual tasks described in the project definition. Once the required resources for each task have been estimated, the resources must be scheduled. This linking of resources to the project schedule can be accomplished by indicating the assignment of resources to tasks directly on the project work flow diagram.

Definition of Scheduling

Scheduling is the translation of the proposed plan into a timetable showing the specific calendar dates for the start and completion of work. The project schedule places an emphasis upon the scheduled start and end of each activity and of the total project. Certain constraints can make the process of scheduling somewhat difficult or lead to a less than ideal schedule. Common constraints include the 9- to 10-month academic year, lack of necessary resources, and the limited availability of personnel for short-term employment.

Possible criteria to consider in developing a schedule include completing the project within minimum time and cost with maximum performance while maintaining an even flow of resources. Due to limited resources or to schedule constraints, it may be necessary to adjust the initial work plan. Although the general configuration of the network may be changed, the planned sequence of work is usually not altered. The project manager must create the best schedule he can within existing constraints. He often must rely on his knowledge and experience regarding the accomplishment of specific tasks in order to create a realistic or feasible project schedule.

Task-Resource Schedule

Gantt or bar charts are often used to visualize the distribution of tasks and resources over time. Such charts, or task-resource schedules, can serve as the basic working tool for resource allocation and scheduling. In constructing such charts, the vertical axis is usually divided into spaces that represent the tasks which comprise the project, and the horizontal axis is used to represent time. The resources assigned to the tasks are visually represented within the task blocks. The tasks are first placed on a Gantt chart in the initially planned order. The sequence of activities lying on the critical path of the work flow should be indicated on the chart in order to provide a basis for using the free or slack time present on other pathways in order to obtain an even flow of resources.

After the schedule of tasks is represented on the Gantt chart, a shopping list of resources is created for each task. Such lists usually have the following resource headings--

- o skilled manpower,
- o contracted services,
- o facilities,
- o equipment,
- o materials and supplies.

In order to effectively schedule resources using the task-resource chart, the task blocks within the chart need to indicate the various resource needs of each task. This can be accomplished by using some type of code. The code might consist of numbers, letters, colors, or some combination of these. The choice of a code is limited only by the individual performing the resource estimating and scheduling. Such a chart with resources for each task coded is somtimes termed a task-event-resource calendar. The quantity of each resource needed during each time period can be determined by summing vertically across tasks for each resource type.

In addition to illustrating manpower needs, the task-event-resource calendar is frequently coded for equipment, facilities and supplies. Note in Figure #1 that the color strips cover only the period of time during which the resource item is needed. For example, if Task C is to prepare a visual illustration and the graphic art is to be photographed, then only one week of time during the task requires a camera, and a different week of time requires the orange-coded artist materials.

Resource-Schedule Optimization

After the resources have been specified for each task, it is often advisable to alter the task schedule in order to reduce the amount of the various required resources. The objective is to share common resources among

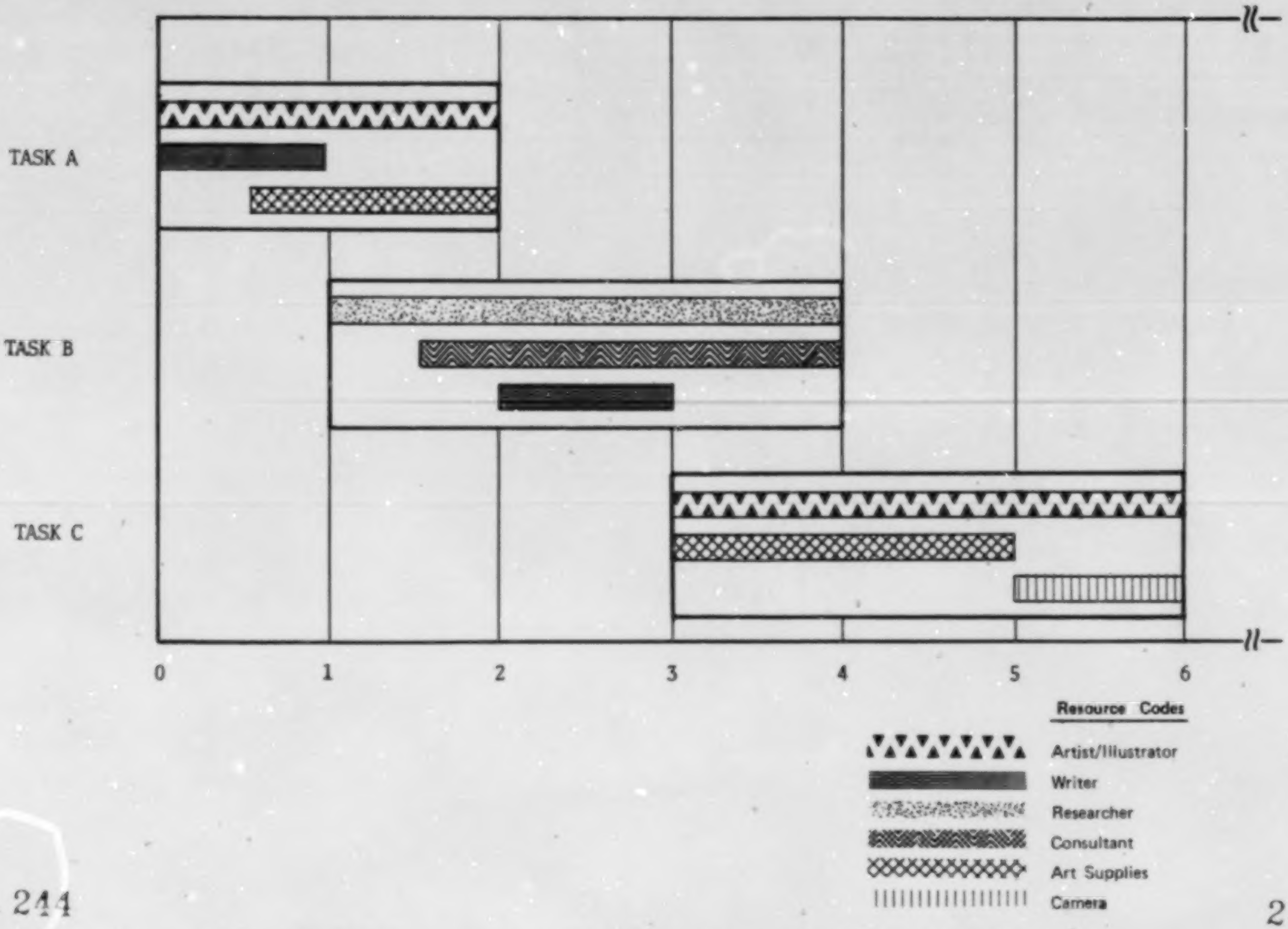


Figure #1--Task-Resource Chart Illustrating Resource Coding and Scheduling several tasks whenever possible, and to limit the amount of idle time for particular resources. The degree of planning and control applied to each type of resource depends, however, upon its relative importance. The effort and expense involved in some instance may not be worth the cost.

An important consideration in scheduling manpower needs is, that with smaller projects, a single person may be required to fill several manpower needs. For example, a project secretary may also be able to serve the statistician role if the tasks can be scheduled so that both roles, or needs, do not have to be served simultaneously. If, however, the overlapping tasks cannot be shifted in time, it may still be possible to use a single skilled person by contracting for additional services to cover one of the positions during the time of the overlap.

This process of determining resources requirements by summing vertically over the tasks, counting the high usuage times of each resource item and smoothing the count by rescheduling tasks is called resource leveling. The task-event resource calendar depicts resource item need over the time range of the project and helps to visualize the effect of task rescheduling upon the resource usage rate.

Resource Summarization

When all resource items have been leveled to an efficient rate of resource use, the planner prepares a project-wide shopping list of resource needs. This list, sometimes referred to as a resource commonality table, contains column headings for resource item descriptions, quantity needed (as determined after leveling), amount of lead time needed before the time is to be used, and the date for ordering the item. The lead time for each item is determined by examining catalogs, interviewing purchasing agents, and recalling past experiences.

Resource estimating and scheduling involves the following activities.

1. Determining the resources needed for each of the tasks.
2. Determining the resource needs for each time period or week of the project.
3. Leveling the project resource needs by rescheduling tasks.
4. Scheduling the project tasks with calendar dates.
5. Developing a total project shopping list of resource needs.

Turn to page 5.20 and read the directions for Exercise A.

Lesson 5--Resource Estimation and Scheduling

Exercise A

Directions: This exercise utilizes the Metropolitan School District as a setting and deals with a follow-up effort to the inservice Behavioral Objectives workshop. Read carefully the general situation and the additional information. Then follow the subsequent directions on page 5.22.

General Situation

A state educational official present at the workshop requested the school to submit a project proposal to modify the instructional materials used in the workshop and to prepare a script/visual prototype set of materials for use throughout the state. The proposal is in the process of being developed. The project is presently scheduled to take place between September 1, 19XX and November 5, 19XX based upon preliminary time estimates secured from the project planning staff.

Selected portions of the total proposal developed so far have been worked out and these are presented as follows:

A. Tasks, titles, descriptions, and time estimates

1. Task P: Prepare Visual Materials--six weeks

   Prepare visual materials which relate to instructional lessons one through five. Illustrate each concept of the lessons with a 2 x 2 slide such that there exists at least two slides per minute of presentation and that each slide will be photographed in color from a professional illustration. The lettering on the visuals will be typewritten. Each illustration will also have a typewritten explanation of the setting, the impression to be conveyed, the length of time for exhibiting, and the concept name. Visitation will be made to the state department from time to time for their reactions.

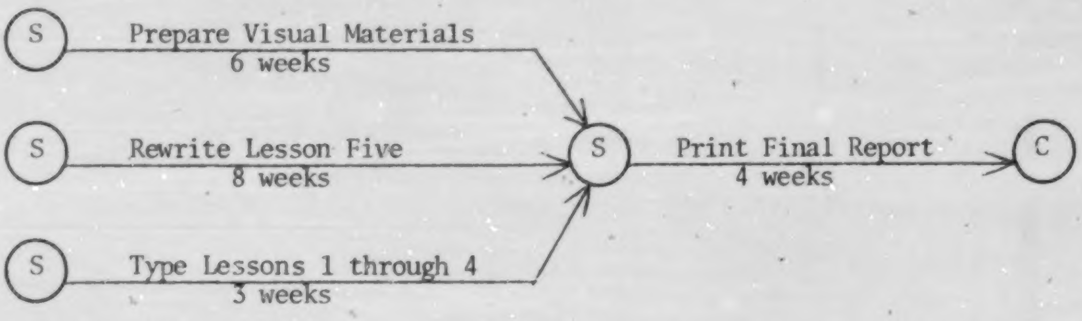
2. Task Q: Rewrite Lesson 5--eight weeks

   Rewrite Lesson 5 such that the lesson flows easier from concept and so that all comments and information from the Metropolitan Retreat tryout are incorporated into the lesson. The time length of the lesson is not to exceed 60 minutes. A 40 minute lesson exercise dealing with statistical analysis and measurements for educational behavior objectives will be developed. The lesson script and exercise are to be typed as final copy. Travel will be made to the state department for review of materials and recommendations for changes.

3. Task R: Type lessons one through four--three weeks. Type the final copy of lessons one through four.

4. Task S: Print Final Report--four weeks. Produce 20 copies of the final report by commercial printer.

B. Suggested work flow for the four tasks.



C. Time and Manpower Estimation for Tasks and Subtasks.

Task	Time	Work Description	Resource	Code	Time Needed
P	6 weeks	Illustrations--Art Work	Illustrator	ILL	3 weeks
		Slides--Camera Work	Illustrator	ILL	2 weeks
		Art Description-Writing	Illustrator	ILL	1 week
		Visuals--Typing	Typist	SEC	4 weeks
Q	8 weeks	Lesson 4--Rewriting	Subject Specialist	SAS	8 weeks
		Exercises--Writing	Statistician	STA	5 weeks
		Statistical Tallies--Typing	Typist	SEC	1 week
		Drafts and Final Copy Typing	Typist	SEC	6 weeks
R	3 weeks	Lesson 1-4--Typing	Typist	SEC	3 weeks
S	4 weeks	Final Report Printing	[Contracted Services]	PS	-----

Turn the page.

Lesson 5--Resource Estimation and Scheduling

Exercise A, continued

Directions: Using the setting and information presented, you are to accomplish two activities in order to complete the exercise.

1. *Using the partially completed task-event-resource calendar (Worksheet One) presented on page 5.23 as a model, you are to place the three tasks--P, R, and S--on the calendar and state the resource items required by the task description and noted in the time-manpower estimation table. You are to adjust the tasks back and forth in time so as to minimize the resources required to support the tasks using a manpower or resource leveling idea.*

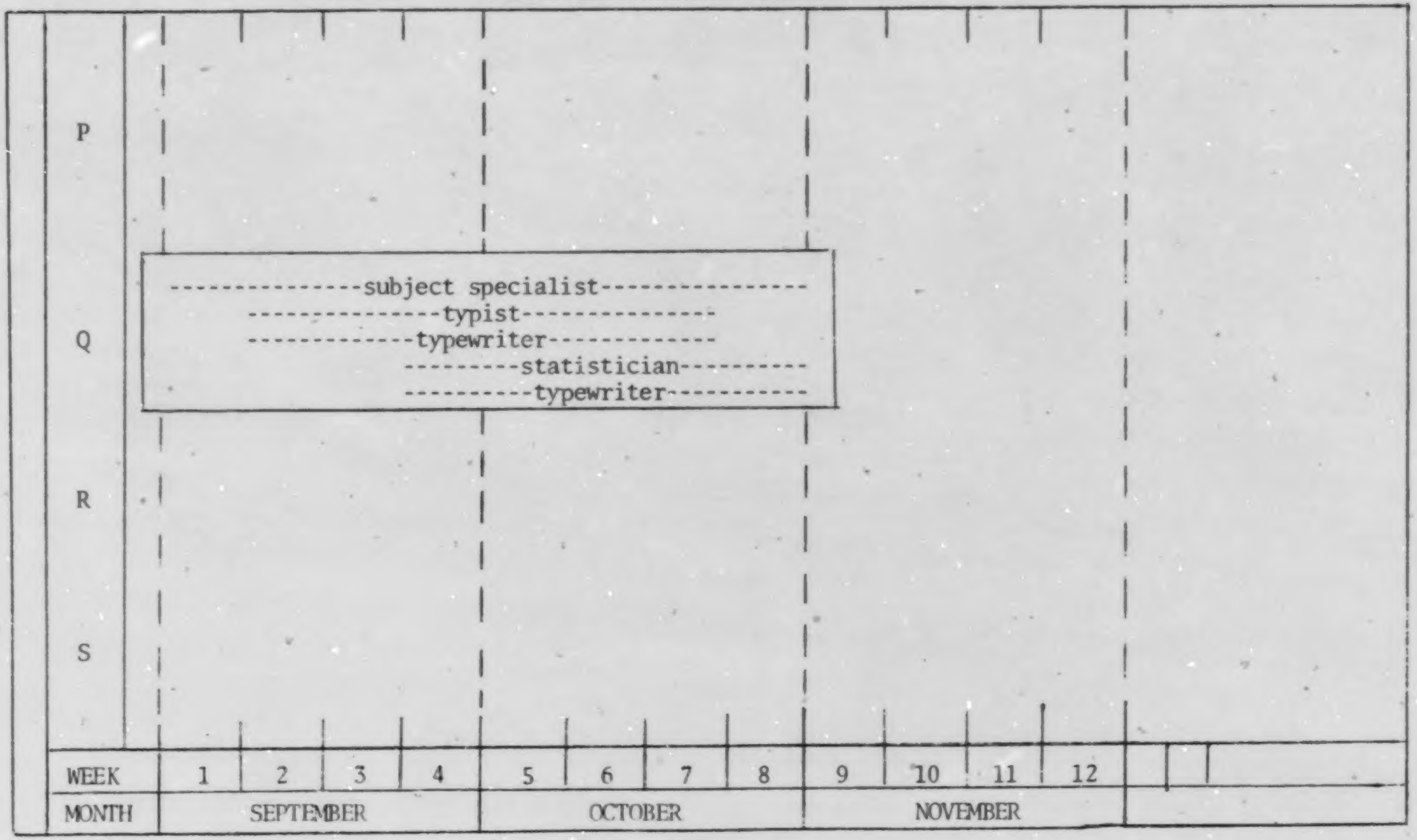
After you have completed the above step, turn to page 5.24 and compare your solution to the one provided there.

2. *After checking your answer to Worksheet One, turn to page 5.25 and complete Worksheet Two according to the instructions.*

Lesson 5--Resource Estimation and Scheduling

Exercise A--Worksheet One

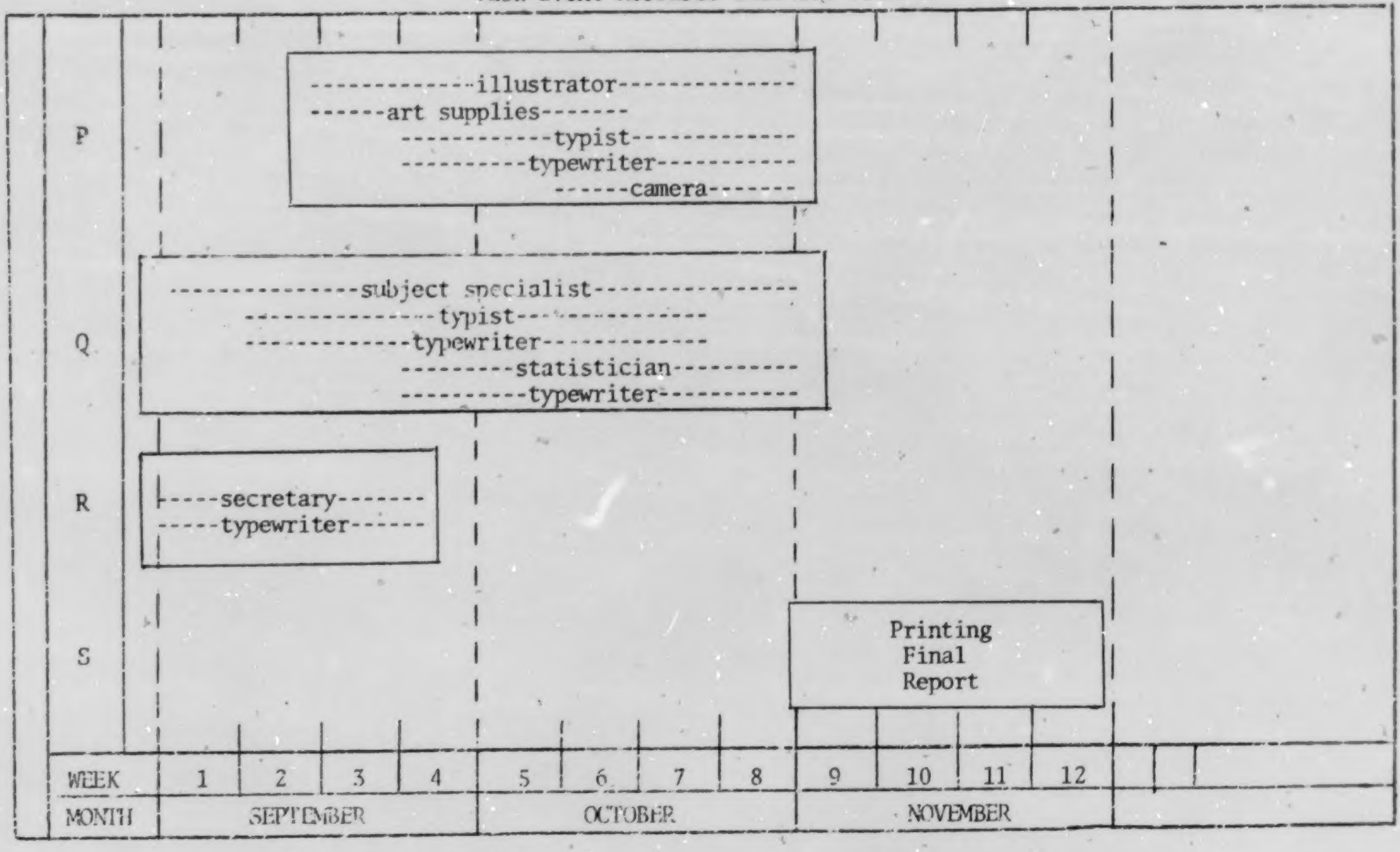
Task-Event-Resource Calendar Form


P
Q
R
S
subject specialist
typist
typewriter
statistician
typewriter
WEEK
1
2
3
4
5
6
7
8
9
10
11
12
MONTH
SEPTEMBER
OCTOBER
NOVEMBER

Lesson 5--Resource Estimation and Scheduling

Exercise A--Worksheet One--Solution

Task-Event-Resource Calendar Form



Lesson 5--Resource Estimation and Scheduling

Exercise A--Worksheet Two

Directions: Using the information from the general setting, the selected information, and your solution from Worksheet One, create or complete the shopping list of needed resources (commonality table) using this worksheet.

After completing the worksheet, turn to 5.26 and check your answers against the solutions presented.

Resource Commonality Table

Line No.	Resource Type	Code	Quantity

Turn the page after completing the worksheet.

Lesson 5--Resource Estimation and Scheduling

Exercise A--Worksheet Two--Solution

Directions: Compare your solution to the one presented below. Study the notes provided to help resolve any discrepancies in your answer. Study again the task descriptions plus solution to Worksheet One as needed to help gain an understanding of the answer.

Resource Commonality Table

Line No.	Resource Item	Code	Quantity
1	Project Manager	PM	1
2	Statistician	STA	1
3.	Secretary/typist	SEC	2
4	Illustrator	ILL	1
5	Subject Area Specialist	SAS	1
6	Typewriter	TWR	3
7	Artist Supplies	AS	1 set
8	35 mm Camera	CAM	1
9	Printing Services	PS	20 copies

Notes regarding solution:

1. You may not have listed the project manager but he must eventually be considered in resource estimation even though not directly involved in the four tasks identified.

2. If you left out the equipment, then you need to think through the task descriptions and the task calendar since these items are needed to do the work.

3. If you listed only one typewriter, you have to consider that tasks overlap and that each typist will have access to a typewriter. In the next lesson, we will deal with the trade-offs in buying or renting of the typewriters.

Go on to the next page.

Lesson 5--Resource Estimation and Scheduling

Directions and Choices Following the Practice Exercises

Based upon the self-evaluation of your performance on the exercise, you have either:

A. *acceptably satisfied the objective of estimating project resource requirements and schedule development. You should now turn to the post-test found on page 5.28.*

Additional examples on resource estimation are found beginning on page 5.30. References for additional reading are listed on page 5.35.

B. *not satisfied the objective, and should select one or more of the following courses of action.*

1. *If your worksheets were correct except for the minor details, then either:*

    a. *Study the additional examples beginning on page 5.30, and then rework exercise A on page 5.20.*

    b. *Read Chapter Eight of Educational Project Management by Desmond L. Cook, and then rework exercise A on page 5.20.*

    c. *Rework exercise A on page 5.20.*

2. *If your worksheets were generally incorrect, then either:*

    a. *View the slide-tape presentation; instructions are on page 5.10. After the presentation, rework exercise A on page 5.20.*

    b. *Read the lesson narrative beginning on page 5.11 and then rework exercise A on page 5.20.*

Lesson 5--Resource Estimation

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

1. What is the common denominator to which all resource items are converted for purposes of control?

   A. Personnel codes
   B. Dollars
   C. Man hours
   D. Calendar dates

2. What is generally considered to be the most expensive project resource?

   A. Equipment
   B. Facilities
   C. Computer services
   D. Personnel

3. What purpose can resource estimation serve in the project definition process?

   A. Examine the resources required for the completion of individual tasks
   B. Specify calendar dates for the acquisition of project equipment and other resources
   C. Translate plan into a time-table
   D. Determine what resources are important to the project

4. Resource estimation is concerned with what action or activity?

   A. Determining the type and quantity of resources needed for each project task and the total project
   B. Estimating the lead time for project resources
   C. Estimating the cost to the organization for project space, facilities and resources
   D. Developing schedules for resource utilization

5. Which one of the following, generally makes the process of project scheduling somewhat difficult?

   A. 12 months academic year
   B. More personnel available for short term employment
   C. More use of computers
   D. Lack of necessary resources

6. What purpose can a Gantt or bar chart serve in the resource estimation process?

   A. To visualize resources related to a few important tasks
   B. To present the task resource schedule
   C. To visualize the distribution of tasks and all resources over time
   D. To visualize resources related to project milestones

7. What important criteria are generally considered while maintaining application of resources in developing the project schedule?

   A. Completing the project in the maximum time with minimum cost
   B. Completing the project to the maximum satisfaction of higher authorities
   C. Completing the project within minimum time and cost with maximum performance
   D. Completing the project within ideal schedule with limited constraints

8. Scheduling or the translation of the project plan into a time-table is done for what purpose?

   A. To allocate resources to the various tasks over time
   B. To identify the limits and constraints important to the project
   C. To insure the successful completion of the project
   D. To show specific calendar dates for the start and completion of work

Indicate whether the statements listed below are true or false by writing a T or F on the line.

9. ____ The sequence of activities lying on the critical path of work flow should be indicated on the Gantt chart.

10. ____ The degree of planning and control applied to each type of resource depends upon its size.

11. ____ The project schedule places an emphasis upon the start and end of each activity.

12. ____ Resource estimating and scheduling involve scheduling the project tasks with school system working dates.

13. _____ Resource estimating and scheduling involve reducing the project resource needs by rescheduling tasks.

14. _____ The bar graph helps to visualize the effect of task rescheduling upon the resource usage rate.

Turn the page and check your answers.

Lesson 5--Resource Estimation and Scheduling

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 5 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the resource estimation process and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 5.10 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 5.36.
2. Read the lesson narrative beginning on page 5.11 and then turn to the Lesson Quality Control Form on page 5.36.
3. Read Chapter Eight of *Educational Project Management* by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 5.36.
4. Study the additional examples beginning on page 5.30, and then turn to the Lesson Quality Control Form on page 5.36
5. Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 5.36.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the resource estimation process and should now turn to the Lesson Quality Control Form on page 5.36 Additional examples on resource estimation are found beginning on page 5.30. References for additional reading are listed on page 5.35.

Multiple Choice

1. B
2. D
3. A
4. A
5. D
6. C
7. C
8. D

True/False

9. T
10. F
11. T
12. F
13. T
14. T

Lesson 5--Resource Estimation and Scheduling

Additional Example A

The determination of resource needs and requirements can be carried out by several different operations. The lesson content presented one approach to the problem--that of using the bar chart or Gantt chart as the basic vehicle. Regardless of the procedure, the objective is to secure some type of estimate of the types and amounts of resources needed to do the individual tasks and the total project. An alternative approach based upon using the network or arrow diagram work flow is presented below and in the illustration accompanying this example.

In this situation, an administrator was interested in securing some reactions of his staff to the problem of student parking at school. A decision was made to utilize survey techniques which involved the preparation of a questionnaire, duplicating it, and then distributing it to the staff. A sample had to be established for trying out the questionnaire and a sample for final data collection established. Analysis and reporting of the data were the final steps.

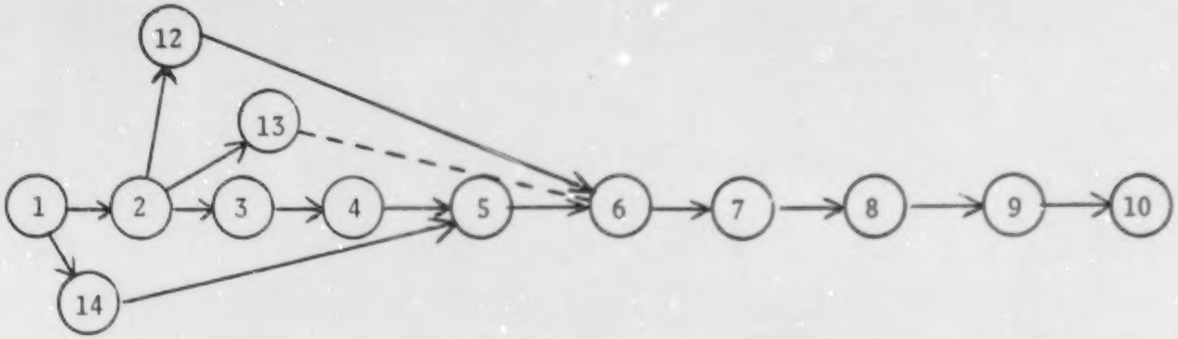
The accompanying illustration provides a summary network for this project with events being numbered. Below the diagram, the administrator made up a form for estimating the number of hours that would be needed from the resources available to him. In addition to his own time (PO), he had the use of a research associate (RA), his secretary (SEC), and the services of a keypuncher (KP) in the department.

It can be observed in this form that not only can the amount type of resource needed for each activity be determined by running across the table horizontally but that the total amount of time to be contributed by each person could be obtained by summing the columns. A last step in the process was to multiply the number of hours by the hourly rate in order to arrive at a quick cost figure.

The table presented here shows only the personnel resources. It could be expanded or a separate table created to show other types of resources such as materials, equipment, travel, and related resource types and quantities.

Lesson 5--Resource Estimation and Scheduling

Additional Example A--Illustration



Event P - S	Activity Description	t_e Weeks	Estimated Hours				Hourly Rate				Dollar Total
			P.D.	R.A.	Sec.	K.P.	P.D.	R.A.	Sec.	K.P.	
01-02	Design Quest.	2.0	10		2		$10.00		$2.00		$104.00
02-03	Tryout Quest. Dupl.	1.0			4				2.00		8.00
02-12	Arr. Key Punch	1.0	1				10.00				10.00
03-04	Tryout Quest.	2.0		10				$5.00			50.00
04-05	Final Form Dupl.	1.0			8				2.00		16.00
05-06	Admin. Quest.	5.0		20				5.00			100.00
06-07	Key Punch	1.0				8				$2.50	20.00
07-08	Data Analysis	4.0	4	20			10.00	5.00			140.00
08-09	Summarize Data	1.0	4				10.00				40.00
09-10	Prep. Final Report	4.0	10	10	20		10.00	5.00	2.00		190.00
12-06	Hire Key Punch	0.4	1				10.00				10.00
02-13	Design Data Analysis	3.0	15				10.00				150.00
13-06	Dummy	0.0	--	--	--	-	---	--	--	--	---
01-14	Design Sample	1.0	4				10.00				40.00
14-03	Select Tryout Sample	0.6	5				5.00				25.00
14-05	Select Final Sample	1.0		10			5.00				50.00
	TOTAL		49	75	34	8					$953.00

Lesson 5--Resource Estimation and Scheduling

Additional Example B

It is generally recognized that personnel and/or manpower is the most costly item in the overall project budget. For this reason, many agencies which provide project support require a fair degree of detail with regard to the personnel requested to support the proposed scope of work. This request is usually met by the project proposer creating a project manning table. Such a table is presented on the next page.

The table presents the estimated manpower needed for an effort very similar to the one undertaken to produce these training materials. Four phases were viewed for the project effort as noted. Estimates were made of the amount and type of personnel resources needed to accomplish each of the phases. It may be noted that some persons were to be used only in selected phases while others were to be carried over the four phases. The total number of man days was calculated and then converted to a percentage of the persons total working time. Thus, the project director will be on the project only about one-quarter of his available time. It indicates that he will be doing other things during the life history of the project, such as teaching classes, meeting with students, and perhaps even running another project. In the case of the graduate assistants, the maximum percent of time they can have is fifty percent. Working within this constraint requires careful thought as to where they will be most needed during the course of the project.

Expression of personnel needs in terms of man days is a common procedure and prospective project managers should be aware of this form of request.

Additional Example B--Project Manning Table

Personnel Requirement	Analysis Phase	Conceptualization Phase	Design Phase	Development Phase	Total	% *
Project Director	8	5	5	30	48	24
Associate Project Director	33	22	22	121	148	100
Advisory Committee/Specialists						
. Instructional System		5	5		10	5
. Instructional Media		5	5		10	5
. Evaluation		5	2	3	10	5
Consultants						
. Project Management	2		2		4	2
. Local School District	2		2		4	2
Technical Support						
. Secretarial-Clerical	33	22	22	121	198	100
. Media Specialist--Graphic Artist		11	11	16	38	19
. Graduate Research Assistant (Instruction)	16	11	11	60	98	50
. Graduate Research Assistant (Management)	16	11	11	60	98	50
. Participant Observers (Two) (Evaluation Specialists)--30 one-half days each				15	15	8
TOTAL	110	97	98	445	731	470

* Based on nine 22 day months

Lesson 5--Resource Estimation and Scheduling

Reading References

Additional knowledge about the process of resource determination and estimation plus the problems associated with project scheduling can be obtained from reading the references cited below.

Archibald, R. D., and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, Chapter 6.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 2.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill Company, 1971, Chapter 8.

Woodgate, H. S. Planning by Network. New York: Brandon Systems Press, 1967, Chapters 10 and 11.

Lesson 5--Resource Estimation

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 5--Resource Estimation and Scheduling

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on resource estimation is now completed. Lesson 6 entitled "Cost Estimates and Budgets" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory pages.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 6 -- Cost Estimates and Budgets

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 6--Cost Estimates and Budgets

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson 6.1
Overview and objectives 6.2
Pretest 6.4
Lesson abstract and content outline 6.6
Lesson text 6.10
Exercises on cost estimates and budgets 6.17
Post-test 6.32
Additional examples 6.34
Reading references. 6.42
Lesson Quality Control Form 6.43

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 6--Cost Estimates and Budgets."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 6--Cost Estimates and Budgets."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 13 minutes, the exercise takes approximately 60 minutes, and about 90 is needed to complete the entire lesson.

Lesson 6--Cost Estimates and Budgets

Overview and Objectives

OVERVIEW

In the previous lesson the scheduling of project tasks and the allocation of resources to the various tasks over time was discussed. In the lesson exercise you completed a task-event-resource calendar and resource commonality table.

This lesson is concerned with translating the information contained in the task-event-resource calendar and resource commonality table into a project budget document. Two types of budgets are introduced--the project manager's budget based upon units of work and the typical budget format produced by the organization's accounting unit.

OBJECTIVES

The student in completing this lesson should be able to prepare a project manager's budget based upon units of work and a typical line-item budget produced for the organization's accounting unit when given a task-event-resource calendar and resource commonality table. The specific objectives of the lesson are as follows:

1. Given a task-event-resource calendar and resource commonality table, the student should be able to:

   a. calculate estimated personnel salary, wages, and fringe benefits.

   b. calculate estimated project indirect costs.

   c. calculate the estimated costs of project equipment, materials and supplies, contracted services, and travel.

   d. estimate the cost of individual project tasks or work units.

2. The student should be able to fill in a project manager's budget and a typical line item budget after calculating project cost estimates.

Complete the pretest on the following page.

Lesson 6--Cost Estimates and Budgets

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they became separated____________.

1. Cost estimation is the process of translating project requirements into what document?

   A. Proposal
   B. Schedule
   C. Accounting procedures
   D. Budget

2. Cost estimation and budgeting is the last step in what project phase?

   A. Organization
   B. Termination
   C. Planning
   D. Preparation

3. What does a budget represent?

   A. A planned expenditure of dollars
   B. An actual expenditure of dollars
   C. A reference document for the business office
   D. The cost account's code for expenditures

4. What is the basic unit of work under which various project costs are accumulated?

   A. Activity
   B. Event
   C. Work package
   D. Goal

5. What are the two main categories used to classify project costs?

   A. Labor costs and indirect costs
   B. Direct costs and indirect costs
   C. Personnel costs and material costs
   D. Direct costs and personnel costs

6. What would be an example of a typical indirect cost?

   A. Tape recorder
   B. Reference books
   C. Salaries of staff
   D. Building electricity costs

7. What basic reference document is used in determining assigned costs to various budget categories?

   A. Expenditure plan
   B. Gantt Chart
   C. Previous project history
   D. Resource commonality table

8. In determining the costs for a typical budget what is generally used as a basic reference?

   A. Previously developed resource commonality table
   B. State budget
   C. Neighboring school system budget
   D. Federal guidelines

Please indicate whether the statements listed below are true or false by writing a T or F on the line

9. _____The budget helps the project manager control project costs

10. _____A costing unit is a unit of work.

11. _____In developing the budget, project indirect costs are usually specified first and itemized.

12. _____The format of the budget is normally specified by the project director

13. _____The final activity in planning is to identify the authority who is to put the plan into operation.

14. _____The project proposal usually is prepared by combining the documents produced during the various steps of the preparation phase.

Check your answers on the following page.

Lesson 6--Cost Estimates and Budgets

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 6 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of cost estimates and budgets and should read the lesson abstract and content outline on pages 6.6 to 6.8. Then begin the tape-slide presentation by turning to the instructions on page 6.9.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of cost estimates and budgets and should read the lesson abstract and outline on pages 6.6 to 6.8. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 6.17. If you do desire to view the tape-slide presentation, turn to the instructions on page 6.9

Multiple Choice

1. D
2. C
3. A
4. C
5. B
6. D
7. A
8. A

True/False

9. T
10. T
11. F
12. F
13. T
14. F

Lesson 6--Cost Estimates and Budgets

Lesson Abstract and Content Outline

ABSTRACT

Cost estimation is the determination of the amount of money needed for a work unit and for the total project. The budget is the plan for expending project resources. Budgeting involves the determination of both direct and indirect costs. Typical budget categories are personnel salaries, wages, and benefits: equipment, materials and supplies, travel, contracted services, and indirect costs. The resource commonality table or "shopping list" is the basic document used in estimating costs and budgeting.

CONTENT OUTLINE

A. Cost estimating and budgeting is the third dimension of project management (after schedule and performance) where the objectives of the project are transformed into the costs required to achieve them.

   1. Cost estimation is the determination of the amount of money needed for a work unit and for the total project.

   2. The budget is the plan for expending project resources.

   3. Money is the unit used in expressing project resources.

B. The budget helps the manager control expenditures during the operation of the project.

C. General budget terms include the following:

   1. Direct costs are costs of resource items purchased for the project.

   2. Indirect costs are those shared with a larger organization where the resources only support the project.

   3. Costing unit is a function or task around which costs are accumulated.

   4. Expenditure plan is a set of decisions about what, when, and how resource items are to be purchased.

D. The style of the budget depends on:

  1. Categories of costs needed for a project.
  2. Typical style used in the parent organization.
  3. Local, state and federal requirements.

E. The following constraints affecting the budgeting process:

  1. Minimum wages, maximum fees, retirement funds, payday restrictions, and certification requirements.
  2. Lack of ability to shift funds from one budget category to another during operations.
  3. Specific requirements of local, state and federal agencies.

F. The following are typical budget categories:

  1. Personnel salary, wages, and benefits.
  2. Equipment
  3. Materials and supplies
  4. Travel
  5. Contracted services
  6. Indirect costs

G. The resource commonality table or shopping list is the basic document used in estimating costs and budgeting. It is used to determine, in proper order, the costs of the resource items needed for the project. The costs are collected under the following categories:

  1. Personnel and benefits
  2. Equipment
  3. Materials and supplies
  4. Contracted services
  5. Travel and per diem
  6. Indirect costs

H. Local source of resource items should be given priority over outside sources.

I. Decisions concerning rental as compared to purchase of equipment.

J. Authority to purchase resources is part of expenditure planning.

K. Budget style should conform to ability of parent organization to collect costs into project categories. Otherwise, project manager may need to develop a second budget for controlling the project.

L. All documents developed during the entire planning phase become part of the project proposal which is to be submitted for funding.

Lesson 6--Cost Estimates and Budgets

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the start of Basic Principles and Techniques of Project Management, Lesson Six--Cost Estimates and Budgets."*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 6--Cost Estimates and Budgets

Lesson Text

Introduction

Cost estimation and budget preparation is the last step in the project planning phase. The project goal and objectives have been stated, the tasks specified, the work flow created, and the resources scheduled as prior steps. The schedule and performance dimensions for the project have thus been specified. This lesson concentrates on the cost dimension.

In placing cost estimation and budget preparation as the last step in the planning phase, it is recognized that in some cases the available dollar amount is known at the start of the project. Objectives and resources to support the work may follow Parkinson's law in that they expand to meet such available funding levels. Even when the final dollar amount is known, however, the planning process outlined in these lessons should be followed.

In addition to providing a written record of planned expenditures, the budget helps the manager control project costs. He does this by looking for deviations from the spending plan as the operational phase of the project is being carried out.

Basic Concepts and Terminology

A budget is a plan for the spending or allocation of money to accomplish some objective or goal. A family develops a budget to accomplish such goals as having a home, providing transportation, or sending the children to college. Just as we allocate money to family objectives, so we allocate money to project objectives. The process of determining how much money is needed to accomplish project objectives is called cost estimation. These estimates are summarized in a document called the budget.

Before considering the process of cost estimation and budget preparation in detail, it is important to define a few key terms or concepts.

Direct costs include expenditures for personnel, equipment, facilities and services obtained especially for the project.

Indirect costs are usually support costs of the larger organization which are pro-rated to a project, but which are not purchased especially for it. Costs such as space, electricity or heat in the building within which the project is located are known as indirect costs or burden or overhead.

A costing unit, or center, is a unit of work. Usually it is a work package, specific function or task under which various costs are accumulated.

An expenditure plan usually shows the rate of expenditure over time. It represents a set of planning decisions concerning expenditure questions such as--

- o what is to be purchased or rented?
- o when is the item to be ordered?
- o what weekly or monthly rate is to be used for the item?
- o how and where is the item to be purchased or rented?

The term constraints refers to limits or boundaries specified by a funding source or school board relating to employee salaries, wages, benefits, and certification, or the ability to shift funds from one budget category to another. Various local, state, and federal policy manuals, statutes, and instructions should be reviewed frequently in order to insure that the budget meets the needs of the project and is within externally-imposed constraints.

Developing the Budget

The process of project cost estimation and budgeting is fundamentally one of translating resources needed to accomplish all of the desired objectives into a common denominator--that of dollars.

Budgets are usually prepared in a form consistent with either the local organizational format or that required by a funding agency. A typical budget lists dollar amounts for personnel (salary, wages, and benefits), equipment, materials and supplies, travel, and other costs and expenses such as preparation of reports, computer services, and consultant services. In determining the cost of these budget items, the previously developed resource commonality table can be utilized as a reference.

In developing the budget, personnel is usually the first direct expenditure category to be costed. The skilled persons needed for the project are costed for a salary, wage, or fee, using current salary or wage scales. The budget should list each person by position rather than by name. If, however, the position will surely be filled by a known person, then his name could be included. The type, rate of pay, and duration of work should be indicated.

In computing the project cost of skilled personnel both a base salary and employee benefits are included. Employee benefits usually include payments or contributions to such items as a retirement fund, social security, a life insurance program, and health or medical insurance. For example, a typical personnel entry might be--Statistician (annual base salary of $10,000 working 100% for 6 months)= $5,000. Employee benefits for the statistician may include the following school system contributions--

- o retirement fund ($5,000 by 12%)=$600 and
- o medical insurance ($25 per month by 6 months)=$150.

The cost entries for equipment, materials, and supplies are determined by first referring to the resource commonality table to identify the needed items and then consulting catalogues and suppliers for cost estimates. Major items should be listed separately. If an item is paid for in installments or rented, the rate of expense per unit time should be specified. Consideration should be given to the alternatives of purchasing, renting, or leasing equipment. Factors to be considered in making the decision are relative cost, the possibility of follow-up projects sharing the equipment, and governmental and local school regulations. Typical project budget entries under equipment and materials and supplies might include--

Equipment

- o electric typewriter (purchase)=$500
- o calculator (rental at $20 per month for 4 months)=$80

Materials and Supplies

- o plexiglass, plywood, and steel materials for construction = $800
- o general office supplies (paper, pencils, and typewriter ribbons) = $100

The next category that often appears in project budgets is contracted services. Estimates of the costs of these services are based upon information from actual bids, reference catalogs, or previous project histories. Consideration should be given to the availability of local pools of either full-time or part-time skilled persons, the availability of equipment from local sources, and the consolidated procurement of materials and supplies.

Contracted services for a project might include entries such as--

- o clerical support ($20 per day for 10 days) = $200

- Final project report printing $1.50 a copy for 20 copies = $30
- computer services (keypunching, $3 per hr. for 20 hrs.) = $60 and
- computer time, $600 per hr. for 30 min. = $300.

Travel is another budget category requiring careful planning. Travel costs are calculated for project staff and consultants and based upon a mileage rate for the use of a personal automobile or an estimated average cost of commercial transportation. In addition, a *per diem* allowance of a fixed amount of money per day, or actual expenses, is allowed to cover expenses such as meals and lodging for each traveler. Other incidental expenses such as taxi or limousine are usually listed separately as part of "travel."

Project indirect costs are usually specified last in the budget since they are often related to part or all of direct costs. The method for calculating project indirect costs or expenses varies from place to place. A fairly typical procedure is to take a percentage of the wages or salaries of project personnel, including consultants. For example, suppose a project has personnel salaries of--

o project manager	$12,000
o secretary	6,000
o statistician, (full-time for 6 mos.)	6,000 and
o research assistant, (one-half time for 12 mos.)	6,000
TOTAL =	$30,000

The agency uses an indirect cost rate of 50% applied only on wages and salaries. The budget entry for indirect costs would be compared by multiplying 50% by $30,000 which equals $15,000. It is the rate that must be determined by law, regulation, or computation. It is often different for each job category.

With these specific line items determined, a line item budget can be prepared for the project. The format of the budget is normally specified by the school district or funding agency.

Budgeting in Perspective

It is important to remember that the budget represents a planned expenditure of dollars by specific categories. Thus, the budget can be used as the basis for controlling costs during project operation. For this purpose, the various project costs should be collected for accounting purposes according to the categories appearing in the budget. Consequently, a major concern when setting up budget categories is the ability of the local accounting system to collect costs into or against the allocated budget categories. If the cost accounting system does not categorize costs in the same way that they are budgeted by the project, difficulties will arise during project operation. Hence, when the accounting system of the parent organization does not collect costs using project categories, project managers are often found using two budget reports -- one produced by the organization's accounting unit for audit and one maintained by themselves for work flow regulation.

Cost estimating and budgeting is the final activity of project planning. Here the resource needs that support the project objectives are converted into dollar cost estimates and fitted into the budget document's format.

Turn to page 6.17 and read the directions for Exercise A.

Lesson 6--Cost Estimates and Budgets

General Situation for Exercises A and B

Directions: Study the following information before beginning the exercises.

Metropolitan School District is conducting a project involving the design and production of instructional materials. Pertinent information regarding the production phase is given below.

A. Resource Commonality Table from Lesson 5

No.	Resource Item	Code	Quantity
1	Project Manager	PM	1
2	Statistician	STA	1
3	Secretary/typist	SEC	2
4	Illustrator	ILL	1
5	Subject Area Specialist	SAS	1
6	Typewriter	TWR	3
7	Artist Supplies	AS	1 set
8	35 mm Camera	CAM	1
9	Printing Services	PS	20 copies

B. Salary/Wage/Fringe Benefit Schedule

1. Salaries (for full-time basis assume four weeks/month):

*project manager	$1000/mo.
secretary/typist	$ 500/mo.
*statistician	$ 800/mo.
illustrator	$1000/mo.
*subject area specialist	$ 800/mo.

2. Fringe Benefits (for all personnel):

retirement	10% of monthly salary
life insurance	$12 per month
health insurance	$24 per month

C. Travel

*Each person with an asterisk before his name under "Salaries" on previous page, travels two trips at $100.00 per trip. This figure covers auto expense, per diem, and air travel.

D. Equipment and Materials Cost

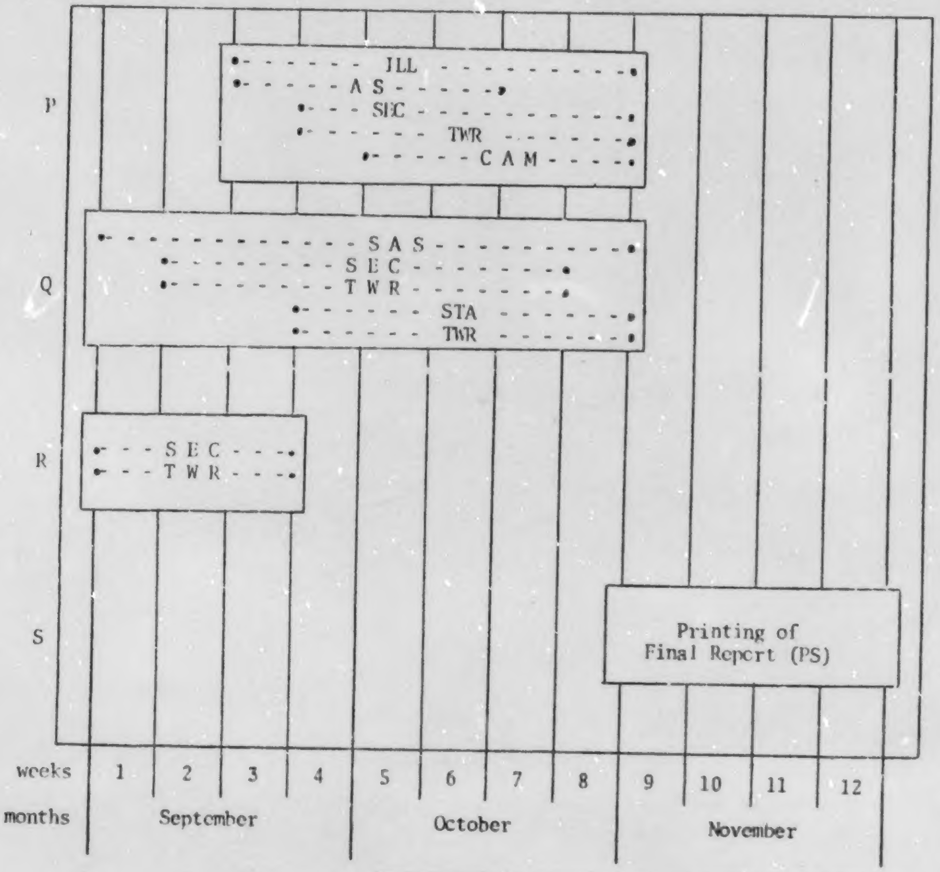
Typewriters (rent three)	rent at $20/month
Artist supplies and materials	$80.00 per set
35 mm camera (one available from the resource pool at the school)	rent by month only at $10/month
Camera film and developing	$60.00

E. Services

Printing services contracted at $1.50 per printed copy

F. Indirect Cost Figured as 50 Percent of Salaries and Wages Only

G. Task-Event-Resource Calendar



Turn the page and begin Exercise A.

Lesson 6--Cost Estimates and Budgets

Exercise A

Directions: After studying the situation described on the previous pages, you are to develop a budget using a project task or costing unit approach. In this case, the four project tasks (P, Q, R, and S) represent costing units. You are to determine the total cost of the project by first figuring the cost of each task, employee benefits, and indirect costs. These figures should then be summed in order to obtain the total project cost. The solution of this type of a costing problem can be facilitated by the completion of a project task-resource matrix. Fill in the blanks in the matrix on the following page and enter the appropriate figures in the budget summary that follows.

Lesson 6--Cost Estimates and Budgets
Exercise A--Project Task-Resource Matrix

Directions: Complete the matrix below using the information provided in the General Situation for Exercise A and B. Task totals (column 15) are figured by adding columns (6), (9), (12), (13), and (14) together.

	Personnel Salary and Wages						Equipment			Materials and Supplies			(13)	(14)	(15)
	(1) * P M	(2) STA	(3) SEC	(4) ILL	(5) SAS	(6) Sub-Total	(7) TWR	(8) CAM	(9) Sub-Total	(10) AS	(11) CAM Supl.	(12) Sub-Total	Travel	Printing Services	Task Totals
TASK-P															$
TASK-Q	1500	1000	750	---	1600	4850	55	--	55	--	--	---	Four Trips 400	--	$ 5305
TASK-R	300	--	375	--	--	675	15	--	15	--	--	---	--	--	$ 690
TASK-S															$
Sub-totals	3000	1000			1600										$
Adminis-trative, Support	Employee Benefits					$	Enter Employee Benefits Total Here →								$
	Indirect Costs					$	Enter Indirect Costs Total Here →								$
Grand Totals						$			$			$	$	$	$

*It is estimated that the project manager spends 30% of his time on task P, 50% on task Q, 10% on task R, and 10% on task S.

Turn the page and proceed.

Lesson 6--Cost Estimates and Budgets

Exercise A--Budget Summary

Directions: Complete the budget summary below by entering the appropriate figures from columns (6), (9), (12), (13), (14), and (15) of the project task-resource matrix. The figures for tasks Q and R are entered on the following page for your reference.

Project Title: Instructional Materials Production

Work Package Time 3 months

Funding Agency: Metropolitan Schools

Dates from 9/1/19XX

COSTING UNIT	TOTALS
TASK--P	

Total ______________________

TASK--Q

1. Salaries and Wages

PM--50% x $1000/mo. x 3 mo. = $1,500
STA--5 weeks x $200/week = 1,000
SEC--6 weeks x $125/week = 750
SAS--8 weeks x $200/week = 1,600
Sub-Total $4,850

2. Equipment

TWR--11 weeks x $5/week = $ 55

3. Travel

Four trips @ $100/trip = $ 400

Total $5,305

TASK--R

1. Salaries and Wages

PM--10% x $1000/mo. x 3 mo. = $ 300
SEC--3 weeks x $125/week = 375
Sub-Total $ 675

2. Equipment

TWR--3 weeks x $5/week = $ 15

Total $ 690

TASK--S

Total ________

ADMINISTRATIVE SUPPORT

Total ____________

PROJECT GRAND TOTAL ____________

Turn the page and correct your work.

Lesson 6--Cost Estimates and Budgets

Exercise A--Solution

Directions: The olution to Exercise A--Budget Summary is given below. Check your figures and work and make the appropriate corrections. The solution to Exercise A--Project-Task-Resource Matrix follows.

Budget Summary

Project Title: Instructional Materials Production
Project Time: 3 months

Funding Agency: Metropolitan Schools
Dates From : 9/1/19xx

COSTING UNIT		TOTALS
TASK - P		
1. Salaries and Wages		
PM - 30% x $1000/mo. x 3 mo. =	$ 900	
SEC - 5 wk. x $125/wk. =	625	
ILL - 6 wk. x $250/wk. =	1,500	
Sub-Total	$3,025	
2. Equipment		
TWR - 5 wk. x $5/wk. =	$ 25	
CAM - 1 mo. x $10/mo. =	10	
Sub-Total	$ 35	
3. Materials and Supplies		
AS - 1 set x $80/set =	$ 80	
CAM Supplies - @ $60 =	60	
Sub-Total	$ 140	
4. Travel		
Two trips @ $100/trip =	$ 200	
Total		$ 3,400

TASK - Q

1. Salaries and Wages
   PM - 50% x $1000/mo. x 3 mo. = $1,500
   STA - 5 wk. x $200/wk. = 1,000
   SEC - 6 wk. x $125/wk. = 750
   SAS - 8 wk. x $200/wk. = 1,600
   Sub-Total $4,850

2. Equipment
   TWR - 11 wk. x $5/wk. = $ 55

3. Travel
   Four trips @ $100/trip = $ 400

Total $5,305

TASK - R

1. Salaries and Wages
   PM - 10% x $1000/mo. x 3 mo. = $ 300
   SEC - 3 wk. x $125/wk. = 375
   Sub-Total $ 675

2. Equipment
   TWR - 3 wk. x $5/wk. = $ 15

Total $ 690

TASK - S

1. Salaries and Wages
   PM - 10% x $1000/mo. x 3 mo. = $ 300

2. Contracted Services
   Printing - 20 copies x $1.50/copy 30

Total $ 330

ADMINISTRATIVE SUPPORT

1. Employee Benefits
   a. Retirement - 10% x $8,850 = $ 885
   b. Life Insurance - 45 wk. x $3/wk. = 135
   c. Health Insurance - 45 wk. x $6/wk. = 270
   Sub-Total $1,290

2. Indirect Costs
   50% x $8,850 = $4,425

Total $ 5,715

PROJECT GRAND TOTAL $15,440

Turn the page for the solution to the Project Task-Resource Matrix.

Lesson 6--Cost Estimates and Budgets

Exercise A--Project Task-Resource Matrix--Solution

Directions: Compare your figures with those given below and make necessary corrections.

	Personnel Salary and Wages						Equipment			Materials and Supplies					
	*PM	STA	SEC	ILL	SAS	Sub-Total	TWR	CAM	Sub-Total	AS	CAM Supl.	Sub-Total	Travel	Printing Services	Task Totals
TASK-P	900	--	625	1500	--	3025	25	10	35	80	60	140	Two Trips 200	--	3400
TASK-Q	1500	1000	750	---	1600	4850	55	--	55	--	--	---	Four Trips 400	--	5305
TASK-R	300	--	375	--	--	675	15	--	15	--	--	---	--	--	690
TASK-S	300	--	--	--	--	300	--	--	--	--	--	--	--	30	330
Sub-totals	3000	1000	1750	1500	1600	8850	95	10	105	80	60	140	600	30	9725
Administrative Support	Employee Benefits					$1290	Enter Employee Benefits Total Here →								$1290
	Indirect Costs					$4425	Enter Indirect Costs Total Here →								$4425
Grand Totals						$14,565			$105			$140	$600	$30	$15,440

*It is estimated that the project manager spends 30% of his time on task P, 50% on task Q, 10% on task R, and 10% on task S.

Turn the page and begin Exercise B.

Lesson 6--Cost Estimates and Budgets

Exercise B

Directions: Using the information from the column totals of the task-resource matrix on page 6.20, you are to complete the budget summary below. It represents a typical budget format produced by an organization's accounting unit. Budget categories are totaled across the entire project duration.

Budget Summary

Project Title: Instructional Materials Production
Work Package Time: 3 months
Funding Agency: Metropolitan Schools
Dates from: 9/1/19xx

Category	Sub-Totals	TOTALS
1. Personnel		
A. Salaries and wages		
B. Employee Benefits		
2. Travel		
3. Equipment		

4. Materials and Supplies

____

5. Contracted Services

____

6. Indirect Costs

____

GRAND TOTAL ================

Turn the page and correct your work.

Lesson 6--Cost Estimates and Budgets

Exercise B--Solution

Directions: The solution to Exercise B is given below. Check your figures and work, and make the appropriate corrections.

Budget Summary

Project Title: Instructional Materials Production
Project Time: 3 months
Funding Agency: Metropolitan Schools
Dates from: 9/1/19xx

Category	Sub-Totals	TOTALS
1. Personnel (manpower)		
A. Salaries and Wages		
PM--3 mo. x $1000/mo.	$3000	
STA-5 wk. x 200/wk.	1000	
SEC-14 wk. x 125/wk.	1750	
ILL-6 wk. x 250/wk.	1500	
SAS-8 wk. x 200/wk.	1600	$8,850
B. Employee Benefits		
Retirement--10% x $8,850	$ 885	
Life Insurance-45 wk. x $3/wk.	135	
Health Insur.--45 wk. x $6/wk.	270	1,290
2. Travel		
6 trips @ $100/trip		600
3. Equipment		
Typewriter--19 wks. @ $5/wk.	$ 95	
Camera--1 mo. + $10/mo.	10	105
4. Materials and Supplies		
Art Supplies	$ 80	
Camera Supplies	60	140

5. Contracted Services	
Printing--20 copies at $1.50/copy	$ 30
6. Indirect Costs	
50% x $8,850	$4,425
PROJECT GRAND TOTAL	$15,440

Turn the page and proceed.

Lesson 6--Cost Estimates and Budgets

Directions and Choices Following the Practice Exercise

Based upon the self-evaluation of your performance on the exercise you have either:

A. acceptably satisfied the objective of developing a project budget and should now turn to the post-test found on page 6.32.

Additional examples on cost estimates and budgets are found on pages 6.34 to 6.41. References for additional reading are listed on page 6.42.

B. not satisfied the objective, and should select one or more of the following courses of action.

1. study the additional examples beginning on page and then rework exercise B on page 6.27.
2. read chapter nine of Educational Project Management by by Desmond L. Cook and then rework exercise B on page 6.27.
3. rework exercise B on page 6.27.
4. view the slide-tape presentation; instructions are on page 6.9. After the presentation, rework exercise B on page 6.27.
5. read the lesson narrative beginning on page 6.10 and then rework exercise B on page 6.27.

Lesson 6--Cost Estimates and Budgets

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last Four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ___________.

1. What is the basic unit of work under which various project costs are accumulated?

   A, Activity
   B. Event
   C. Work package
   D. Goal

2. What does a budget represent?

   A. A planned expenditure of dollars
   B. An actual expenditure of dollars
   C. A reference document for the business office
   D. The cost account's code for expenditures

3. Cost estimation and budgeting is the last step in what project phase?

   A. Organization
   B. Termination
   C. Planning
   D. Preparation

4. Cost estimation is the process of translating project requirements into what document?

   A. Proposal
   B. Schedule
   C. Accounting procedures
   D. Budget

5. In determing the costs for a typical budget what is generally used as a basic reference?

   A. Previously developed resource commonality table
   B. State budget
   C. Neighboring school system budget
   D. Federal guidelines

6. What basic reference document is used in determining assigned costs to various budget categories?

   A. Expenditure plan
   B. Gantt chart
   C. Previous project history
   D. Resource commonality table

7. What would be an example of a typical indirect cost?

   A. Tape recorder
   B. Reference books
   C. Salaries of staff
   D. Building electricity costs

8. What are the two main categories used to classify project costs?

   A. Labor costs and indirect costs
   B. Direct costs and indirect costs
   C. Personnel costs and material costs
   D. Direct costs and personnel costs

Please indicate whether the statements listed below are true or false by writing a T or F on the line.

9. ____ A costing unit is a unit of work.

10. ____ In developing the budget, project indirect costs are usually specified first and itemized.

11. ____ The budget helps the project manager control project costs

12. ____ The final activity in planning is to identify the authority who is to put the plan into operation.

13. ____ The project proposal usually is prepared by combining the documents produced during the various steps of the preparation phase.

14. ____ The format of the budget is normally specified by the project director.

Check your answers on the following page.

Lesson 6--Cost Estimates and Budgets

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 6 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of cost estimates and budgets and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 6.9 and proceeding. After the presentation turn to the Lesson Quality Control Form on page 6.43.
2. Read the lesson narrative beginning on page 6.10, and then turn to the Lesson Quality Control Form on page 6.43.
3. Read chapter nine of Educational Project Management by Desmond L. Cook, and then turn to the Lesson Quality Control Form on page 6.43.
4. Study the additional examples beginning on page 6.34, and then turn to Lesson Quality Control Form on page 6.43.
5. Rework the lesson post-test, and then turn to Lesson Quality Control Form on page 6.43.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of cost estimates and budgets and should now turn to the Lesson Quality Control Form on page 6.43. Additional examples of budgets are found on pages 6.34 to 6.41.
References for additional reading are listed on page 6.42.

Multiple Choice

1. C
2. A
3. C
4. D
5. A
6. A
7. D
8. B

True/False

9. T
10. F
11. T
12. T
13. F
14. F

Lesson 6--Cost Estimates and Budgets

Additional Example

The Metropolitan City School Board has initiated a project to survey the attitudes of the students and community toward the school administration, staff, and educational program. The project proposal identifies the following five major tasks:

A. Develop the project objectives and survey design.

B. Develop the survey instruments.

C. Administer the survey instruments.

D. Analyze and interpret the data.

E. Prepare a project final report.

The man selected to head the project has prepared the resource commonality table and task-event-resource calendar which appear below.

A. Resource Commonality Table

Resource Item	Code	Quantity
Project Manager	PM	1
Statistician	STA	1
Researcher	RES	1
Writer	WR	1
Secretary	SEC	1
Typewriter	TWR	1
Duplication	DUP	1000 pages
Printing Services	PS	30 copies
Paper	PR	8 units
Mailing	ML	1

B. Salary/Wages/Benefit Schedule

1. Salaries (assume four weeks/month)

project manager	$1000/month
statistician	800/month
researcher	1000/month
writer	800/month
secretary	500/month

2. Fringe Benefits (all personnel)

retirement	10% of salary
life insurance	$12 per month
health insurance	$24 per month

C. Equipment

Typewriter	rent at $40/month

D. Materials and Supplies

Paper	$25/unit
Mailing	$100

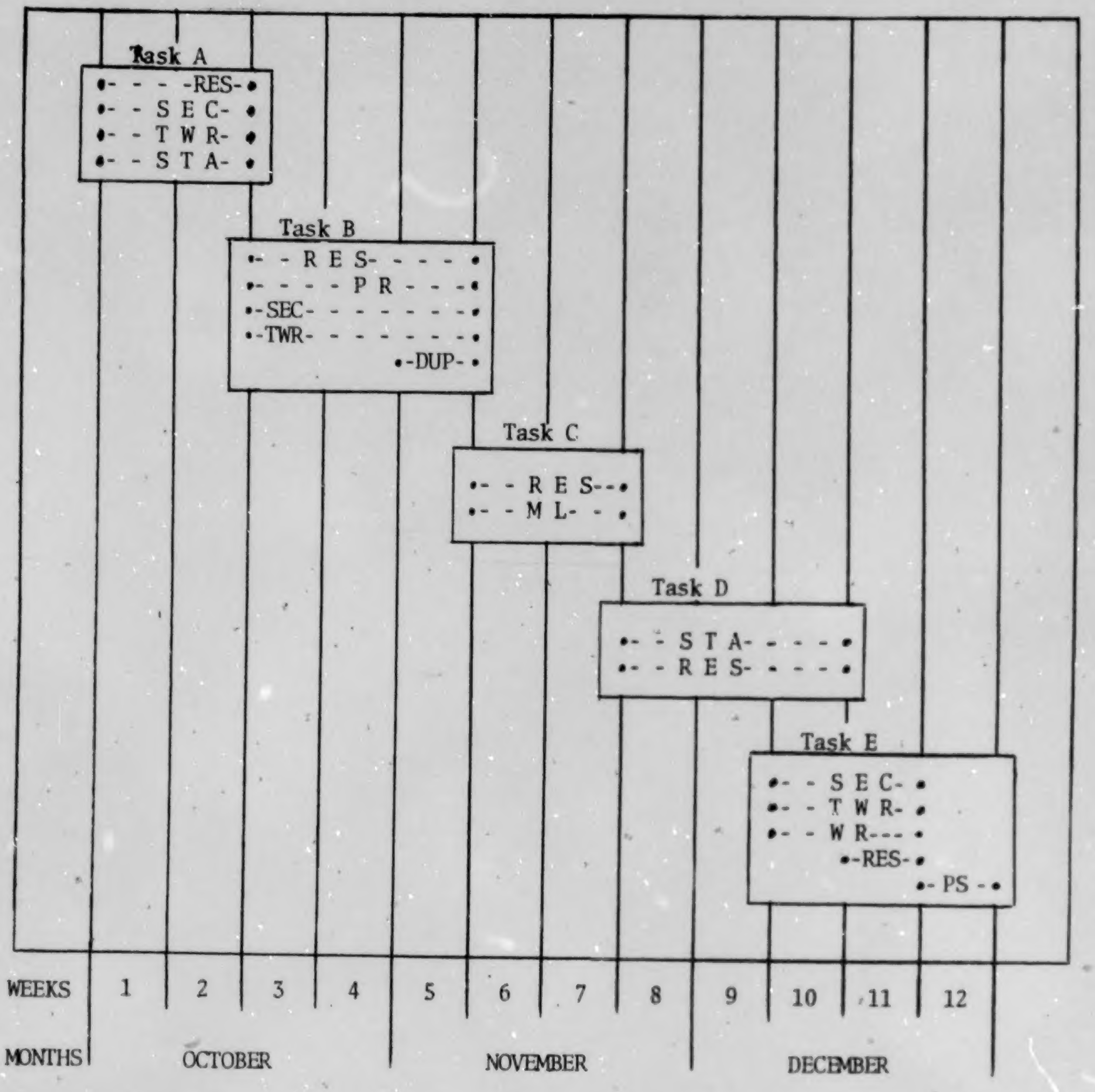
E. Services

Duplicating services contracted at $0.03/page
Printing services contracted at $1.50/copy

F. Indirect Cost

Figured as 50% of salaries and wages only

G. Task-Event-Resource Calendar


Task A
•- - - -RES- •
•- - S E C- •
•- - T W R- •
•- - S T A- •
Task B
•- - R E S- - - - - •
•- - - - P R - - - •
•-SEC- - - - - - - - •
•-TWR- - - - - - - - •
•-DUP- •
Task C
•- - R E S- - •
•- - M L- - •
Task D
•- - S T A- - - - - •
•- - R E S- - - - - •
Task E
•- - S E C- •
•- - T W R- •
•- - W R- - - •
•-RES- •
•- PS - •
WEEKS
1
2
3
4
5
6
7
8
9
10
11
12
MONTHS
OCTOBER
NOVEMBER
DECEMBER

Based upon the proceeding information, the project manager then prepared the following project task-resource matrix.

Project Task-Resource Matrix

	Personnel Salary and Wages						Equipment			Materials and Supplies			Duplicating	Printing	Task
	PM *	STA	RES	WR	SEC	Total	TWR		Total	Paper	Mailing	Total			
TASK-A	900	400	500	--	250	2,050	20		20	--	--	----	---	--	$2,070
TASK-B	600	--	750	--	375	1,725	30		30	200	--	200	30	--	$1,985
TASK-C	300	--	500	--	--	800	--		--	--	100	100	--	--	$ 900
TASK-D	600	600	750	--	--	1,950	--		--	--	--	---	--	--	$1,950
TASK-E	600	--	250	400	250	1,500	20		20	--	--	---	--	45	$1,565
Sub-Totals	3000	1000	2750	400	875	8,025	70		70	200	100	300	30	45	$8,470
Adminis-trative Support	Employee Benefits					$1,136	Enter Employee Benefits Total Here →								$1,136
	Indirect Costs					$4,013	Enter Indirect Costs Total Here →								$4,013
Grand Totals						$13,174			$ 70			$ 300	$30	$45	$13,619

*It is estimated that the project manager spends 30% of his time on task A, 20% on task B, 10% on task C, 20% on task D, and 20% on task E.

After completing the project task-resource matrix, the project manager filled in the project manager's budget using the totals obtained from adding across the matrix. He completed the line item budget using the totals obtained from adding down the matrix. These budget summaries appear on the following pages.

Lesson 6--Cost Estimates and Budgets

Additional Example--Budget Summary 1

Project Title: Attitude Survey
Funding Agency: Metropolitan Schools
Project Time: 3 months
Dates From: 10/1/19xx

Project Manager's Budget

Costing Unit	Sub-Totals	Totals
TASK-A		
1. Salaries and Wages		
PM---30% x $1,000/mo. x 3 mo. =	$ 900	
STA--2 weeks x $200/week =	400	
RES--2 weeks x $250/week =	500	
SEC--2 weeks x $125/week =	250	
Sub-Total	$2050	
2. Equipment		
TWR--$ 20		
	Total	$2070
TASK-B		
1. Salaries and Wages		
PM---20% x $1,000/mo. x 3 mo. =	$ 600	
RES--3 weeks x $250/week =	750	
SEC--3 weeks x $125/week	375	
Sub-Total	$1725	
2. Equipment		
TWR--$ 30		
3. Materials and Supplies		
Paper-$200		
4. Contracted Services		
Duplicating--$ 30		
	Total	$1985

TASK-C

1. Salaries and Wages

PM---10% x $1,000/mo. x 3 mo. = $ 300
RES--2 weeks x $250/week = 500
Sub-Total $ 800

2. Materials and Supplies

Mailing--$100

Total $ 900

TASK-D

1. Salaries and Wages

PM---20% x $1,000/mo. x 3 mo. = $ 600
STA--3 weeks x $200/week = 600
RES--3 weeks x $250/week = 750
Sub-Total = $1950 Total $1950

TASK-E

1. Salaries and Wages

PM---20% x $1,000/mo. x 3 mo. = $ 600
RES--1 week x $250/week = 250
WR---2 weeks x $200/week = 400
SEC--2 weeks x $125/week = 250
Sub-Total = $1500

2. Equipment

TWR--$ 20

3. Contracted Services

Printing--$ 45

Total $1565

ADMINISTRATIVE SUPPORT

1. Employee Benefits

a. Retirement-------10% x $8025 =$803
b. Life Insurance---37 wk. x $3/wk.= 111
c. Health Insurance-37 wk. x $6/wk.= 222
$1136

2. Indirect Costs

50% x $8025=$4013

Total	$ 5149
Project Grand Total	$13,619

Lesson 6--Cost Estimates and Budgets

Additional Example--Budget Summary 2

Project Title: Attitude Survey
Funding Agency: Metropolitan Schools

Project Time: 3 months
Dates From: 10/1/19xx

Accounting Unit Budget

Category	Sub-Totals	Sub/Grand Totals
1. Personnel (manpower)		
A. Salaries and Wages		
PM---$3000		
STA-- 1000		
RES-- 2750		
WR--- 400		
SEC-- 875		
$8025		
		$8025
B. Employee Benefits		
Retirement--------$803		
Life Insurance---- 111		
Health Insurance-- 222		
$1136		
		$1136
2. Equipment		
TWR--$ 70.00		$ 70
3. Materials and Supplies		
Paper----$200.00		
Mailing--$100.00		
$300.00		$ 300
4. Contracted Services		
Duplicating--$ 30		
Printing----- 45		$ 75
5. Indirect Costs		
50% of $8025.00		$4013
	PROJECT GRAND TOTAL	$13,619

Lesson 6--Cost Estimates and Budgets

Reading References

Additional knowledge about cost estimates and budgets can be obtained by reading from the references cited below:

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 2, pp. 21-2.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 9.

Woodgate, H. S. Planning by Network. London, England: Business Publications, Ltd., 1964, Chapter 12, pp. 266-72.

Lesson 6--Cost Estimates and Budgets

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 6--Cost Estimates and Budgets

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on cost estimates and budgets is now completed. Turn the page and read the directions for Phase Test 1.

PHASE TEST 1

Project Planning Phase

Directions: The following pages contain a series of items in a variety of formats which are designed to assist you in assessing the knowledge you have acquired from Lessons 1 through 6 of Module 2. This set of items gives emphasis to cognitive abilities as contrasted to attitudes or skills.

The expectation is that you should answer all items correctly in order to consider your learning in this phase as being complete. In this sense, the test can be considered as a mastery test, a minimum essentials test, or a criterion-referenced test.

Read each question carefully and circle the letters of the best response on the separate answer sheet immediately after this page. After you complete the last item, review your responses then turn to page 21 which contains the answers for the several phase tests and check your answers against those presented there.

Turn the page and begin.

Answer Sheet

for

Project Planning Phase

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
11. A B C D
12. A B C D
13. A B C D
14. A B C D
15. A B C D
16. A B C D
17. A B C D
18. A B C D
19. A B C D
20. A B C D

Project Planning Phase Test

1. What statement probably best characterizes a project?

   A. Objectives are set within time, cost, and performance specifications.
   B. Usually only a single objective is involved.
   C. Projects are usually finite in character, complex in nature, consists of a unique series of tasks, and are generally a one-of-a-kind activity.
   D. Project objectives once established eliminate the need for further planning.

2. What criterion is used for determining the number of levels necessary to define a project?

   A. The finest detail possible.
   B. Skeletal breakdown.
   C. Necessary detail based on project manager's desires or wishes.
   D. Must always extend to five levels of breakdown.

3. Why does the work breakdown structure enable a project manager to be more consistent in his planning?

   A. It aids in determining the critical path.
   B. The network cannot be developed without the work breakdown structure.
   C. It establishes a framework of objectives to be accomplished and for all work that is to be performed for each objective.
   D. The time estimates of the project can be determined.

4. What term best describes the primary or central role of a project manager?

   A. Coordinator.
   B. Information generator.
   C. Decision-maker.
   D. Developer of products.

5. Starting from the top and going down, what is characteristic of any work breakdown structure?

   A. Cost and schedule status is summarized.
   B. Way in which the various end objectives of work are related is determined.
   C. Work to be performed is defined in successively greater detail.
   D. Prime objective leasing to the attainment of each supporting objective is not carefully defined.

6. How is scheduling defined?

   A. Action which adjusts operations to predetermined standards.
   B. The translation of the plan developed from the previous steps in the planning process into a timetable showing the specific calendar date for the start and completion of work.
   C. A statement containing the major goal of the project, but also includes a recognition of limits and constraints important to the project.
   D. The "organizational unit dedicated to the attainment of a goal--generally the successful completion of a development product on time within the budget, and in conformance with performance specification."

7. Time estimates should be provided by what person on the project?

   A. Project manager.
   B. Project writer.
   C. The person performing the task.
   D. An efficiency expert.

8. In network terminology, what do we call a specific definable accomplishment?

   A. An activity.
   B. An event.
   C. An objective.
   D. A task.

9. What do we call the process of breaking down a system into interdependent parts?

   A. System management.
   B. System synthesis.
   C. System analysis.
   D. System sequence.

10. Which one of the following is probably the single most important factor in scheduling?

    A. Time.
    B. Efficient utilization of personnel and facilities.
    C. Availability of resources.
    D. Accounting for overestimate of abilities.

11. What major subsystems comprise the planning system?

    A. Reports, scheduling, project plan, management actions.
    B. Decision implementation, time estimation, scheduling, project definition.
    C. Project plan, project definition, time estimation, scheduling, cost/budget.

12. What is generally recognized as the first step in the management process?

    A. Writing a proposal.
    B. Personnel employment.
    C. Bidding for projects.
    D. Establishing objectives.

13. What is the definition for work package?

    A. The tasks required to accomplish the lowest level end items.
    B. A summation across the work breakdown structure.
    C. The basic time planning and performance element in the PERT/Time system.
    D. A device by which actual times are determined and actual costs accumulated.

14. Why are traditional budgeting and accounting practices generally not applicable to the project situation?

    A. Projects are non-continuous and are due to be totally consumed.
    B. The traditional budgetary mechanism is too detailed and lacks flexibility.
    C. Educational budgets are based upon annual or biennial appropriations.
    D. Too many resource and personnel allocations are on a part-time basis.

15. What basic relationship exists between the scheduling process and work flow?

    A. Work flow provides the framework for scheduling.
    B. Scheduling provides the restraints necessary for work flow.
    C. Work flow and scheduling are PERT activities.
    D. The more complex the work flow the simpler the scheduling process.

16. What types of costs are usually involved in developing the project budget?

    A. Direct costs and indirect costs.
    B. Labor costs and indirect costs.
    C. Indirect cost, direct costs, previous costs.
    D. Direct cost, work package costs, previous costs.

17. What is the chief product of the project definition phase of the planning system?

    A. Personnel assignments.
    B. Network diagram.
    C. Work breakdown structure.
    D. Timetable of events.

18. What word would best typify the management approach contrast to the traditional approach to budgeting?

    A. Inputs.
    B. Outputs.
    C. Charge number.
    D. Control.

19. What is the function of a task-event-resource calendar?

    A. It indicates resource needs in priority order.
    B. It assigns a calendar date for the completion of project tasks.
    C. It indicates resource needs over time.
    D. It provides an ordering of project tasks.

20. What would be an example of a project indirect cost?

    A. Salaries paid to the project staff.
    B. Heat and light charges for the office.
    C. Retirement contributions for the project staff.
    D. Unanticipated overtime payment for project personnel.

EDUCATIONAL
PROJECT
MANAGEMENT
INSTRUCTIONAL
SYSTEM

EPMIS

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Volume II - Lessons 7 to 12

C. PETER CUMMINGS & DESMOND L. COOK

RESEARCH FOR BETTER SCHOOLS, INC.
Administering for Change Program
1700 Market Street Philadelphia, Pa. 19103

and

FACULTY OF EDUCATIONAL DEVELOPMENT
Educational Program Management Center
The Ohio State University

THESE MATERIALS DEVELOPED BY

C. Peter Cummings
and
Desmond L. Cook

Assisted By

Steven Gyuro
Rodney J. Ball

PROJECT MANAGEMENT COMPONENT
C. Peter Cummings, Director

ADMINISTERING FOR CHANGE PROGRAM
Sanford Temkin, Director
Mary V. Brown, Deputy Director

RESEARCH FOR BETTER SCHOOLS, INC.
Robert G. Scanlon, Executive Director

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MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 7 -- Project Start-Up

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 7--Project Start-Up

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson. 7.1
Overview and objectives 7.2
Pretest 7.3
Lesson abstract and content outline 7.6
Lesson text 7.9
Exercises on project start-up 7.14
Post-test 7.30
Additional examples 7.32
Reading references. 7.34
Lesson Quality Control Form 7.35

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 7--Project Start-Up."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 7--Project Start-Up."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 10 minutes, the exercise takes approximately 60 minutes, and about 85 minutes is needed to complete the entire lesson.

Lesson 7--Project Start-Up

Overview and Objectives

OVERVIEW

The previous lesson was the last lesson on the first phase of project management--the planning and proposal preparation phase. The lesson was concerned with translating the information contained in the task-event-resource calendar and resource commonality table into a project budget document.

This lesson is the first of two lessons on the project preparation phase of project management. The lesson concentrates on proposal and contract review, project manager appointment, personnel recruitment, equipment and materials acquisition, space and facilities acquisition, and project handbook development. The next lesson focuses upon the development of the project information system.

OBJECTIVES

The student when given a project proposal should be able to:

1. Specify needed revisions in the proposal in preparation for contract negotiation.
2. Identify the job qualifications and principal duties of selected project personnel.
3. Describe the project orientation and communication plan.
4. Identify equipment, material, facility, and space needs of the project.
5. Locate information to be included in the project policy and procedures handbook.

Complete the pretest on the following page.

Lesson 7--Project Start-Up

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated______________.

1. What phase of the project life cycle is concerned with the questions, problems and procedures of getting the project underway?

   A. Planning
   B. Preparation
   C. Organization
   D. Operational control

2. What factor usually has a strong impact upon the successful initiation of the project?

   A. Lack of necessary computer facilities
   B. Time interval between the approval and the actual start-up date of the project
   C. Inadequate time to review the project proposal
   D. Lack of competent research staff

3. What is the major task of the project manager in project start-up?

   A. Recruitment and employment of project personnel
   B. Preparing the project budget
   C. Improving project operations by establishing an information system
   D. Orientation of project staff

4. How is project equipment and materials categorized?

   A. Listing characteristics
   B. Specifying date needed
   C. Specifying date needed and place of assignment
   D. Listing characteristics and specifying date needed and place of assignment

5. At what time in the project life cycle should the project policy and procedures handbook be developed?

   A. When the decision to write the project proposal is made
   B. Upon completion of project definition
   C. During the project start-up phase
   D. When the project is funded

6. What is the main purpose of a policy and procedures handbook?

   A. To facilitate the project manager's decision-making during project operations
   B. To inform project staff about budgetary procedures
   C. To improve project operations and staff morale
   D. To provide more information about future activities of the project

7. Who should be involved in the development of the project policy and procedures handbook?

   A. Only senior project staff
   B. Project director and selected project staff
   C. All project staff
   D. Project director with aid of consultants

8. Who should receive copies of the policy and procedures handbook?

   A. All senior project staff
   B. All project staff
   C. Project director and funding agency
   D. Project director and selected project staff

Indicate whether the statements listed below are true or false by writing a T or F on the line.

9. _____Little or no lead time may result in the late start of a project because of the lack of necessary personnel.

10. _____Once the project proposal is completed, it is seldom revised

11. _____Contract negotiations will dictate all of the operational guidelines of the project.

12. _____Most all project supervisory staff should be given the authority to review project plans and take necessary actions.

13. _____All project personnel need to be given a perspective of the total project

14. _____Staff orientation activities must be designed to secure co-operation from participating functional departments within the school district.

15. _____Project policy and procedures handbook should be revised and kept current as the project moves through the operational phase.

Turn the page and check your answers.

Lesson 7--Project Start-Up

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 7 pretest are listed down the right margin. The left column is for the first page, the right column is for the second. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of project start-up and should read the lesson abstract and content outline beginning on page 7.6. Then begin the tape-slide presentation by turning to the instructions on page 7.8.

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of project start-up and should read the lesson abstract and content outline on page 7.6. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 7.14. If you do desire to view the tape-slide presentation, turn to the instructions on page 7.8.

Multiple Choice

1. B
2. B
3. A
4. D
5. C
6. C
7. C
8. B

True/False

9. T
10. F
11. F
12. F
13. T
14. T
15. T

Lesson 7--Project Start-Up

Lesson Abstract and Content Outline

ABSTRACT

Project start-up focuses upon the activities involved in preparing to put a project into operation. A project start-up plan should be developed. It should cover proposal and contract review, project manager appointment, personnel recruitment, equipment and material acquisition, space and facilities acquisition, and project handbook development. Careful planning and preparation at this stage can prevent many problems and delays in project operations.

CONTENT OUTLINE

A. Project preparation focuses upon activities necessary to get the project underway once it is funded.

B. The two basic tasks involved in project preparation are:

    1. Preparing to put the project into operation--covered in this lesson.

    2. Developing the project information system--covered in Lesson 8.

C. A plan for project start-up should be developed.

    1. The plan should cover proposal and contract review, project manager appointment, personnel recruitment, equipment and materials acquisition, space and facilities acquisition, and project handbook development.

    2. The ability to implement the plan is affected by the lead time available between the approval date and project start date.

D. Proposal and contract review often results in changes in areas of performance, objectives, schedule, budget manpower requirements, and performance specifications.

E. A project director should be identified and appointed early. He must be given the authority and responsibility to get the project underway.

F. Personnel recruitment should be planned.

1. Personnel requirements should be listed.
2. Personnel should be recruited from inside and outside the school district.
3. The project staff and district should be oriented to the project.
4. It may be necessary to conduct needed staff training.

G. Equipment and materials acquisition should be planned.

1. Equipment includes direct items necessary to project operations but not normally consummable.
2. Materials are direct cost items but usually viewed as consummable.

H. Space and facilities acquisition should be planned.

1. It is important to have an adequate and pleasant work space.
2. Desks, typewriters, storage cabinets, and related items to be secured should be identified.

I. A project handbook should be developed.

1. It should contain general procedures and policies for project staff guidance.
2. It should be distributed to each staff member.

Lesson 7--Project Start-Up

Instructions

1. Set up the recorder, projector, and screen.
2. Place the carousel slide tray onto the projector and advance the tray to the start of "Basic Principles and Techniques of Project Management--Lesson 7, Project Start-Up."
3. Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.
4. Start the recorder and advance the slides with the "change tone."

Lesson 7--Project Start-Up

Lesson Text

Introduction

The first phase in the life cycle of a project is that of planning. The developed project definition, work flow, time estimates, resource schedule, and budget are combined to form a project plan. If properly prepared, the plan wil receive a favorable review and the project will be approved and funded. This approval, which may come in the form of a letter, phone call or telegram, signals the second phase in the project life cycle--the project preparation phase. This phase is concerned with the questions, problems and procedures of getting the project underway.

The preparation phase can be divided into two major tasks--gearing-up for project operations and establishing a project information system. This lesson is concerned with the first of these two tasks and Lesson 8 with the second.

The preparations undertaken in the time interval between the approval and the actual start-up date of the project have a strong impact upon the success of the initiation of the project. Poor preparation may result in the project being initiated before competent personnel have been secured or delayed because of the lack of necessary personnel. Either of these conditions may have negative effects upon the entire life of the project.

Project Preparation Activities

In order to insure a smooth start-up, a project preparation plan should be developed. The lead time for developing and carrying out a preparation plan may vary from only a few days to several months.

Some of the major preparation activities that must be included in the plan are: appoint a project manager, review the proposal and contract, employ personnel, acquire equipment and materials, and obtain space and facilities. These activities are discussed below.

Project Manager Appointment.- If not done as part of the planning phase, the identification and selection of the project director or manager is the first task to be accomplished in this phase. Ideally, the individual who directed the project planning activity should be maintained to manage project operations. As noted before, this individual is critical to the success of the project. Once appointed, the project director or manager should be given almost complete authority to negotiate, make recommendations, review project plans and contracts, and take whatever actions are necessary to get the project underway.

Proposal/Contract Review.- The project plan, while well done, may best be considered as an ideal or initial plan, which may have to be adjusted to fit a variety of situations and circumstances. One of the first tasks is to review possible changes that must be made to the original proposal as submitted as a result of conflicts with the contract actually negotiated. Such adjustments are often settled in an activity referred to as "contract negotiation." The negotiation results in a contractual armagement which may dictate changes in the operation of the project. Changes in the plan may occur in several places. Among the most common are: objectives, schedule, budget, manpower requirements and performance specifications.

Personnel Employment.- In order to insure meeting the project needs that were described in the resource allocation steps of the planning process, a careful listing of required personnel should be prepared, including the following minimum information: duties and responsibilities, skill level, education and experience, date needed, duration of employment, proposed salary, and benefits. Certain personnel may have already been assigned to the project by their being listed in the project budget by name, title, and duties. Persons with desired competencies may have to be located within the functional departments of the school district or recruited from outside.

In addition, plans should be developed for the orientation and training of staff personnel so that they can begin functioning almost immediately on project tasks. Project personnel need to be given a perspective on the total project and their contributions to it. Orientation activities can be designed to provide visibility to the project and to secure cooperation from those functional departments within the district that will be participating in the project. District-wide communication regarding a new project is essential and can be handled by special briefing sessions, newsletters, reports, formal announcements and news releases. Such details as the project's mailing address and telephone number should be disseminated to all functional departments within the school and to those external agencies that might become involved with the work or results of the project.

Equipment and Materials Acquisition.- The equipment and materials acquisition part of the preparation plan should be developed in a manner similar to that for personnel. Equipment and materials should be listed in terms of their characteristics, date needed, and place of assignment. In order to insure orderly and timely acquisition of equipment and materials, planning prior to their utiliation is mandatory.

Space and Facilities Location.- Obtaining space and facilities for the project involves securing work and storage space, as well as desks, typewriters, file cabinets, and items of a similar nature. Sufficient space should be acquired so that project personnel can work closely together and yet have an adequate work climate and an atmosphere conducive to effective and efficient project operations. Project space should be adequate to house both immediate and future staff and to store project equipment and materials.

Project Handbook.- Staff operations and communications can be facilitated during both the preparation and operations phases if a project handbook is developed as part of the preparation activities. Development of the handbook should involve the project staff in order to secure their support, keep them informed, enable them to better see their role in the project and assume responsibility for that role. If the project handbook is kept in loose leaf form, it can be modified with ease as the project develops.

Although no standard format exists, a project handbook should generally cover such items as project environment or setting, general project information, organizational chart, reporting formats and frequency, staff meeting schedules, purchase order procedures and other logistics, schedules, contract, communication flow, evaluation procedures, and training and travel information. Copies of the project handbook should be distributed to all members of the project staff. It should be revised and kept current as the project moves through the operations phase.

Summary

The development and implementation of a project preparation plan will assist greatly in getting a project off to a good start. The major activities involved in project preparation, or "start-up", are: appointing a project manager, reviewing the project proposal and contract, employing personnel, acquiring equipment and materials, and locating and obtaining space and facilities. The early accomplishment of these activities will greatly increase the likelihood of having a successful project.

Turn the page and read the directions for Exercise A

Lesson 7--Project Start-Up

General Setting for Exercise A

Setting

Jonesville School District has received word that their proposed individualized reading project has been funded. Assume that you have been appointed project manager. You are preparing for contract negotiation and the start-up of the project. The superintendent has asked that you review the proposal and anticipate what aspects of it may need revision.

Directions: Read the project proposal on pages 7.15 through 7.21 before answering the questions beginning on page 7.22.

Lesson 7--Project Start-Up

Proposal for Exercise A

JONESVILLE SCHOOL DISTRICT
Jonesville, Piedmont

DEPARTMENT OF CURRICULUM AND RESEARCH

ESEA Title I--Individualized Reading Proposal
1970-1971

SUBSECTION II--PROGRAM ACTIVITIES

This ESEA proposal is concerned with the establishment of an Individualized Reading Laboratory to meet the special education needs of educationally deprived children from grade three through six in the following elementary schools.

Melrose Hudson Linden Armstrong Washington

The primary concern of this proposal is with children who suffer from a dual disadvantage: Academic and Fiscal.

It is this proposal's intent to improve the learning climate for these children in a rapid effective manner. A secondary purpose of this proposal is to train teachers and aides who have little or no experience in Individualized Reading.

Brief Description:

Reading classes will serve children in grades three, four, five, and six. Children in small groups (10-14) will receive individual instruction in a laboratory type setting. After identification of the child's weakness through the utilization of diagnostic instruments, the teachers will develop an individualized prescription from a wide variety of learning materials to overcome his educational weakness in the area of reading.

Those children evidencing the most severe deficiencies in reading will be transported to the "Barrier Analysis Centers" for intensive diagnosis. Upon completion of the diagnostic process, individual remedial prescription will accompany each child as they return to the home school Reading Laboratory.

1.1 SUBJECT TO BE TAUGHT: Individualized Reading

1.2 GRADE LEVELS:

3rd--125 pupils	5th--50 pupils	Total--350 pupils
4th--125 pupils	6th--50 pupils	

1.3 PARTICULAR NEEDS:

1.3.1 Each of the listed schools are recommended for inclusion in the activity, and to provide adequate space.

1.3.2 Each school contains children who have frustrations towards school, lack of interest and development of self-responsibility.

1.3.3 Individualized assistance in the use of materials both A-V and regular.

1.3.4 Special help on a small group or individual basis in the area of verbal skills and usage.

1.3.5 Supportive services from an adult other than the classroom teacher in times of emotional crisis.

1.3.6 Supportive services from a non-professional in the area of home-school relations.

1.4 OBJECTIVES:

1.4.1 To produce students who demonstrate willingness to participate in the identification of their own "barriers to learning."

1.4.2 To produce students who demonstrate the ability to locate from a well-organized collection of materials, those learning materials which they need for their own learning activities in the corrective reading program.

1.4.3 To produce students who are highly stimulated to "go ahead on their own" whenever possible.

1.4.4 To produce students who know when they need help and to ask for help when they need it.

1.4.5 To produce students who are able to analyze their own work to the small extent needed to decide whether they have mastered a single behavioral skill in reading, and when they are ready for a test on that skill.

1.4.6 To produce students who are developing a growing sense of accomplishment and positive self-concept.

1.4.7 To produce students who can relate their enjoyment in reading to their need to attain mastery of certain fundamental reading skills.

1.4.8 To produce students who have changed from disinterested non-readers to those who take pride in their growing ability to read and to enjoy reading and discussion.

1.5 METHODS, PROCEDURES, AND ORGANIZATION:

1.5.1 Individualized materials used are those that are keyed to specific behavioral reading skills; stated in a way that the students, as well as the teacher and teacher aides, can understand the objectives to which the materials are keyed. The Oak Leaf list of behavioral skills will be the basis for the program.

1.5.2 Each student will be given on a daily basis, an individually prescribed lesson plan, together with feedback information on how well he succeeded in his previous day's work. This plan is prepared by the teacher, but with involvement of the aide and the student.

1.5.3 Sufficient help, in the form of instructional aides for the teacher, will give each student the attention necessary for him to learn to participate in his own "learning barrier analysis". Such instructional help will be provided by teachers and aides, who have received intensive training and practice in guiding students to accept more self-responsibility in their planning and in their daily work. (The Jonesville Schools already have a cadre of teachers and aides who are so prepared.)

1.5.4 A "reading materials center" will be organized in which the programmed materials are arranged so that students can learn to carry out their "prescription" for the day's work.

1.5.5 A daily progress record, in terms of behavioral skills mastered, will be kept for each student. This record is to be reviewed and up-dated each day by the instructional aide, so that it is readily available as a basis for the teacher in preparing the new prescription for each child.

1.5.6 Pre and post-tests, which are keyed to the specific behavioral skills above mentioned, are provided. The pretest will help identify the specific needs of each child before he embarks on a new skill unit. The post-test will be given at an appropriate time to demonstrate the individual student's mastery of that skill. The teacher and aide will involve the student in the analysis of his own pre and post-tests.

1.5.7 A "behavioral journal" will be maintained on each student. This journal, to be maintained by the teacher with the help of the instructional aide, will identify each student's attitudinal and study patterns. It will be used extensively in arriving at the regular report card "grade."

1.5.8 These corrective reading procedures will be used to supplement and reinforce the regular class reading program for the identified students.

1.6 STAFF:

1.6.1 Each school will need a full time reading teacher to facilitate the reading laboratory.

1.6.2 There will be a need for an instructional aide in each of the Reading Centers to work with the teacher in identifying individual student needs and in providing the clerical and instructional support needed to provide the daily feedback information necessary for each student to enable the program in corrective reading to succeed. The aide will be necessary in each classroom to provide the time and energy for frequent contact with each child. The aide will help each student to learn to organize and proceed in each step of the program, without regard to what other children may be doing.

1.6.3 An itinerant reading supervisor will work with teachers.

1.7 MEASUREMENT TOOLS/TECHNIQUES AND EVALUATION DESIGN

1.7.1 The Stanford Achievement Test (primary and intermediate) will be given at the beginning and at the end of the program.

1.7.2 The Slosson Oral Reading Test--Slosson Educational Publications, East Aurora, New York.

1.7.3 The Sullivan Associates (McGraw Hill & Co.) placement tests will be given at the beginning of the program to each student. From this starting point individual progress records will be maintained.

1.7.4 The New Developmental Reading Tests--Bond, Balowan and Hoyt.

1.7.5 A before and after attitude inventory will be given to each student. This will reflect the change of attitudes that are identified as some of the listed objectives under section 1.4.

1.7.6 All individual skill mastery records will be kept as evidence of the units completed.

1.7.7 A summary of each teacher's and each aide's responses in the student behavior journal (see section 1.5) will be reported.

1.7.8 Responses of parents to a checklist of observed behavioral changes in their children will be reported.

Part 2--SUPPORTIVE SERVICES--DNA

Part 3--INSERVICE--DNA

Part 4--PARENT PARTICIPATION--DNA

SUBSECTION III--DISSEMINATION

The Jonesville School District views dissemination as a twofold affair. First, there must be local efforts in order to build local support for innovative programs. Secondly, there must be effort beyond the local in order to spread information of successful programs.

Local Dissemination:

Periodic news stories will be released to local press and radio. An attempt will be made to place several feature stories about the program in the local press and on local radio.

Program spokesmen will be made available to PTA and other groups. We will actively encourage building principlas to make use of these spokesmen.

Program personnel will carry out some dissemination activities with school personnel and community people as a part of their everyday activities and other work done by these personnel and community people as a part of their everyday activities. All work done by these personnel will be identified as federally funded under ESEA Title I.

The School District will prepare and distribute a brochure on the program.

State and National Dissemination:

The brochure mentioned under local dissemination will be available for wider distribution.

Program and other personnel will be available for work at state and national conferences. They will, in fact, seek out the opportunity to appear on panels at such conferences.

SUBSECTION IV--JUSTIFICATION

Roles of Teacher and Learner:

The teacher's major role is clarifying and reiterating general and specific expectations for the learner. He addresses himself as a diagnostician. This includes the defining, delimiting, correcting, activating, and reinforcing that role.

Role of Evaluation:

1. To reach the individual learner, and effectively influence his participation in the activities of the classroom, requires continuous pretest data.

2. There is also need for techniques to "demonstrate" what they have learned at some time after the bulk of learning has occurred. This role is best served by giving post-tests of behaviorally defined educational goals.

3. Screening and placement functions must be served by specific placement tests.

4. Continuous testing will provide feedback data.

Need to Develop New Strategies of Instruction:

To direct the learner to make appropriate sequences of choices through a programmed course of experiences requires:

1. The teacher to have information concerning student's apparent motivations, competencies, and concentration of attention, on things to be learned.

2. The teacher to theorize about the state of rapport he has with student, and govern himself accordingly.

3. The rationale of teaching to center around activities and games through which the learner is invited to practice desirable performance.

4. A clear understanding by teacher and student of the complex nature of the helping relationship.

BUDGET

		SALARIES	OTHERS	CONTRACTED	TOTAL
INSTRUCTIONAL (200)					
213	5 Teachers	$46,000			
218	5 Teacher Aides	15,000			
222	Materials & Supplies		$13,369		
224	Audio-Visual Equipment		2,000		
	TOTAL INSTRUCTIONAL				$76,369
FIXED CHARGES (800)					
831	Retirement		3,000		
832	FICA		3,000		
834	Insurance		1,100		
	TOTAL FIXED CHARGES				$ 7,100
	TOTALS	$61,000	$22,469		$83,469

Turn the page and begin Exercise A.

Lesson 7--Project Start-Up

Exercise A

A. Preliminary Proposal Review

Directions: Briefly describe what kind of revision may be needed in the following proposal sections.

1. Objectives ______________________________

____

2. Schedule ______________________________

____

3. Budget ______________________________

____

4. Manpower requirements ______________________________

____

____

5. Performance specifications ______________________________

____

B. Project Manager Appointment

Directions: State the job qualifications of the project manager as specified in the project proposal (if they exist).

Job Qualifications ______________________________

____

C. Personnel Acquisition

Directions: Locate and specify the job duties and qualifications of the "teacher (instructional) aide" as described in the project proposal.

Position Title: Teacher (Instructional) Aide

1. Principal Duties

   a. Help the teacher prepare a daily, individually prescribed lesson plan for each student (paragraph 1.5.2).

   b. ______________________________

   c. ______________________________

   d. ______________________________

   e. ______________________________

   f. ______________________________

   g. ______________________________

2. Qualifications

   ____

D. Orientation and Communication

Directions: Identify the media or communication process and general content to be presented for local dissemination as specified in the dissemination section of the proposal.

1. Media or Communications Process

   a. ____________________

   b. ____________________

   c. ____________________

   d. ____________________

   e. ____________________

2. Content to be Presented

   ____

   ____

E. Equipment and Materials

Directions: The proposal budget lists audio-visual equipment. What are the general specifications, date needed, and place of assginment of this equipment?

General Specifications: ____________________

____

Date Needed: ____________________

Place of Assignment: ____________________

F. Space and Facilities Acquisition

Directions: The proposal refers to a "reading materials center" (paragraph 1.5.4). Briefly describe the activity to be performed there and state the specifications for the space and facilities needed.

Activity Description: ______________________________

____

Space and Facilities Specifications: __________________

____

G. Project Procedures Handbook

Directions: Check those items listed below for which additional information other than that contained in the proposal is needed in order to write the project policy and procedures handbook.

_____ 1. Project Environment

_____ 2. General Project Information

_____ 3. Organizational Chart

_____ 4. Report Formats and Frequency

_____ 5. Purchase Order Procedures

_____ 6. Schedules

_____ 7. Contract

_____ 8. Communication Flow

_____ 9. Evaluation

_____10. Training of Project Personnel

_____11. Travel

Turn the page and check your work.

Lesson 7--Project Start-Up

Exercise A--Solution

Directions: The answers to the questions in Exercise A appear below. Read the answers and check your work. Your answers need only approximate those provided below.

A. Proposal-Contract Review

1. Objectives *Need to specify and/or define performance criteria.*

2. Schedule *No schedule is presented. Need to create an activity or task time schedule.*

3. Budget *Budget format is improper. Need to revise according to standard budget format presented in the previous lesson.*

4. Manpower Requirements *They are identified in the budget. They should also be specified in number along with the tasks or activities they will perform.*

5. Performance Specifications *None defined. Need to specify them in the project objectives.*

B. Project Manager Appointment

Job Qualifications *None given. They should be included in the proposal.*

C. Personnel Acquisition

Position Title: Teacher (Instructional) Aide

1. Principal Duties

a. Help the teacher prepare a daily, individually prescribed lesson plan for each student. (1.5.2)

b. Give each student the attention necessary for him to learn to participate in his own "learning barrier analysis". (1.5.3)

c. Keep a daily progress record in terms of behavioral skills mastered for each student. (1.5.5)

d. Help the teacher and student in the analysis of student pre and post tests. (1.5.6)

e. Help the teacher maintain a "behavioral journal" on each student. (1.5.7)

f. Help the teacher in identifying individual student needs. (1.6.2)

g. Provide the clerical and instructional support needed to supply the daily feedback information necessary for each student. (1.6.2)

2. Qualifications

Completed intensive training and practice in guiding students to accept self-responsiblity in their planning and daily work.

D. Orientation and Communication

1. Media or Communication Process

a. radio

b. press

c. speaking engagements

d. everyday contracts

e. program brochure

2. Content to be Presented

Not specified.

E. Equipment and Materials

General Specifications: *Audio-visual equipment, but it is not specified sufficiently.*

Date Needed: *Not specified*

Place of Assignment: *Not specified*

F. Space and Facilities Acquisition

Activity Description: *Students are to carry out their "prescription" for the day's work. Further specification is needed.*

Space and Facilities Specifications: *Should be large enough to house the programmed materials and students. Further specification is needed.*

G. Project Procedures Handbook *(comments added for clarification)*

X 1. Project Environment - *Is there a project office? What space will be provided for the "reading materials center"?*

___ 2. General Project Information - *Subsection II*

X 3. Organizational Chart - *Not presented in the proposal.*

X 4. Report Formats and Frequency - *Not specified in the proposal.*

X 5. Purchase Order Procedures - *Are they different from the regular school procedures?*

X 6. Schedules - *Not specified in the proposal.*

X 7. Contract - *Will follow contract negotiations.*

X 8. Communication Flow - *Not specified in the proposal.*

X 9. Evaluation - *No evaluation strategy specified in the proposal.*

___ 10. Training of Project Personnel - *Supposedly none is needed.* (1.5.3)

X 11. Travel - *Mentioned but not specified.*

Turn the page and proceed.

Lesson 7--Project Start-Up

Directions and Choices Following the Practice Exercise

Directions: Based upon the self-evaluation of your performance on the exercise you have either:

A. acceptably satisfied the objectives of the lesson and should now turn to the post-test found on page 7.30.

Additional examples on project start-up are found on pages 7.32 to 7.33. References for additional reading are listed on page 7.34.

B. not satisfied the objectives, and should select one or more of the following courses of action.

1. Study the additional examples beginning on page 7.32, and then rework exercise A on page 7.22.
2. Read pages 225 to 227 of *Educational Project Management* by Desmond L. Cook, and then rework exercise A on page 7.22.
3. Rework exercise A on page 7.22.
4. View the slide-tape presentation; instructions are on page 7.8. After the presentation, rework exercise A on page 7.22.
5. Read the lesson narrative beginning on page 7.9 and then rework exercise A on page 7.22.

Lesson 7--Project Start-Up

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ____________.

1. What is the major task of the project manager in project start-up?

   A. Recruitment and employment of project personnel
   B. Preparing the project budget
   C. Improving project operations by establishing an information system
   D. Orientation of project staff.

2. How is project equipment and materials categorized?

   A. Listing characteristics
   B. Specifying date needed
   C. Specifying date needed and place of assignment
   D. Listing characteristics and specifying date needed and place of assignment

3. What factor usually has a strong impact upon the successful initiation of the project?

   A. Lack of necessary computer facilities
   B. Time interval between the approval and the actual start-up date of the project
   C. Inadequate time to review the project proposal
   D. Lack of competent research staff

4. What phase of the project life cycle is concerned with the questions, problems and procedures of getting the project underway?

   A. Planning
   B. Preparation
   C. Organization
   D. Operational control

5. Who should receive copies of the policy and procedures handbook?

   A. All senior project staff
   B. All project staff
   C. Project director and funding agency
   D. Project director and selected project staff

6. Who should be involved in the development of the project policy and procedures handbook?

   A. Only senior project staff
   B. Project director and selected project staff
   C. All project staff
   D. Project director with aid of consultants

7. What is the main purpose of a policy and procedures handbook?

   A. To facilitate the project manager's decision-making during project operations
   B. To inform project staff about budgetary procedures
   C. To improve project operations and staff morale
   D. To provide more information about future activities of the project

8. At what time in the project life cycle should the project policy and procedures handbook be developed?

   A. When the decision to write the project proposal is made
   B. Upon completion of project definition
   C. During the project start-up phase
   D. When the project is funded

Indicate whether the statements listed below are true or false by writing a T or F on the line.

9. _____Most all project supervisory staff should be given the authority to review project plans and take necessary actions.

10. _____Contract negotiations will dictate all of the operational guidelines of the project.

11. _____Once the project proposal is completed, it is seldom revised.

12. _____Little or no lead time may result in the late start of a project because of the lack of necessary personnel.

13. _____Staff orientation activities must be designed to secure cooperation from participating functional departments within the school district.

14. ____ Project policy and procedures handbook should be revised and kept current as the project moves through the operational phase.

15. ____ All project personnel need to be given a perspective of the total project.

Turn the page and check your answers.

Lesson 7--Project Start-Up

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 7 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of project start-up and should select one or more of the following courses of action.

1. *View the slide-tape presentation by turning to page 7.8 and proceeding. After the presentation turn to the Lesson Quality Control Form on page 7.35.*
2. *Read the lesson narrative beginning on page 7.9, and then turn to the Lesson Quality Control Form on page 7.35.*
3. *Read pages 225-227 of* Educational Project Management *by* Desmond L. Cook*, and then turn to the Lesson Quality Control Form on page 7.35.*
4. *Study the additional examples beginning on page 7.32, and then turn to Lesson Quality Control Form on page 7.35.*
5. *Rework the lesson post-test, and then turn to the Lesson Quality Control Form on page 7.35.*

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of project start-up and should now turn to the Lesson Quality Control Form on page 7.35. Additional examples of project start-up are found beginning on page 7.32.
References for additional reading are listed on page 7.34.

Multiple Ch

1. A
2. D
3. B
4. B
5. B
6. C
7. C
8. C

True/False

9. F
10. F
11. F
12. T
13. T
14. T
15. T

Lesson 7--Project Start-Up

Additional Examples

Example A

Project X in Jonesville Local Schools was about to begin a project designed to change the attitude of students and staff in three buildings. The project proposal stated that "space sufficient to house the project staff and required facilities and equipment will be rented in a local business office building," since space was not available in the schools to house the project staff and required facilities and equipment. No more consideration was given to this item until word was received that the project was funded and could start in six weeks. At that time, the superintendent did not begin to look for project office space, but waited until two weeks for the scheduled start of the project. When he did begin to look for office space, he found that none was available until the end of the next month. Consequently, the project begun one month late due to the failure to initiate project start-up activities early.

Example B

Project Y in Smithville City Schools began as scheduled. One of the early project work units required the assistance of a consultant from the nearby university. No attempt, however, was made to ascertain his availability until one week before his help was needed. Unfortunately, the professor was scheduled to be out-of-town the week he was needed and heavily booked the following week. Consequently, project operations were held up for two weeks while waiting for his services.

Example C

Project Z in Orangeville City Schools was nearing completion of its first year of operation. In order to receive continuation funds for the second year, the funding agency was requiring evaluative data regarding pupil achievement according to the project objectives. Eight months after the start of the project, the project director hired an evaluation specialist to design the necessary evaluation instruments. It was soon discovered, however, that it was impossible for the evaluation specialist to design instruments to measure pupil attainment of the project objectives since the project objectives were written without reference to any performance criteria or specifications. For example, one objective stated that the project would "produce students who are highly stimulated to go ahead on their own whenever possible." Consequently, the project staff had to take time out to create new project objectives that included performance specifications and were congruent with the activities conducted during the first year of the project. Then they had to hope the funding agency would accept their "after the fact" changes.

Lesson 7--Project Start-Up

Reading References

Additional knowledge about project start-up can be obtained by reading from the references cited below.

Archibald, R. D. and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, Chapter 8.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapters 7 and 11.

Lesson 7--Project Start-Up

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

   ☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 7--Project Start-Up

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on project start-up is now completed. Lesson 8 entitled "Project Information System" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory pages.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 8 -- Project Information System

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 8--Project Information System

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet for Basic Principles and Techniques of Project Management

Introduction to lesson 8.1
Overview and objectives 8.2
Pretest 8.4
Lesson abstract and content outline 8.7
Lesson text 8.11
Exercises on information systems 8.17
Post-test 8.24
Additional example 8.27
Reading references. 8.28
Lesson Quality Control Form 8.29

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 8--Project Information System."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 8--Project Information System."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen
EPMIS Module 2--Lesson 7--exercise setting

TIME REQUIRED. The tape-slide presentation runs approximately 10 minutes, the exercise takes approximately 30 minutes, and about 70 minutes is needed to complete the entire lesson.

Lesson 8--Project Information System

Overview and Objectives

OVERVIEW

Previous lessons covered the activities involved with planning a project. Lesson 7 presented the gear-up activity which includes the acquisition of project personnel, space, and resources. This lesson deals with establishing the project information system whereby the manager makes provisions for the storage and subsequent use of information pertinent to the operation of the project.

The lesson which follows this one deals with project management controls and the operations of the project.

OBJECTIVES

The student in completing this lesson should have knowledge about a project information system and be able to create the project organization plan.

The specific objectives of the lesson are as follows:

1. The student can identify and describe the three basic tasks involved in setting up the Project Management Information System.

2. The student can identify the essential components of a project handbook.

3. The student can develop an organizational chart for project personnel showing lines of authority and responsibility.

4. The student can develop a management responsibility chart for a project.

5. The student can define the meaning of "data base" and indicate its role in management information systems.

6. The student can identify the basic elements of a data base for the project situation.

7. The student can state the relationship between the functions of planning and control and how the data base and information system is used to facilitate these management functions.

Turn the page and read the directions for the pretest.

Lesson 8--Project Information System

Pretest

Directions: Please take time to carefully answer the multiple choice and true /false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_________.

1. What is the commonly identified procedure or operation used in knowing what is happening in the operation of a project?

   A. Project proposal
   B. Project budget
   C. Project information system
   D. Project final report

2. What is the principal purpose or function of the project information system?

   A. To aid in the development of a project proposal
   B. To serve as a basis to know project problems
   C. To assist in acquiring materials
   D. To aid in the development of the negotiated contract

3. What is the basic or principal function of the project data base?

   A. To collect information for writing the project final report
   B. To accumulate information regarding the budget
   C. To accumulate background information about funding source operations
   D. To accumulate in one place all of the schedule, budget and performance decisions made during the planning phase

4. A well structured, organized and presented data base facilitates work in what phase of the project life cycle?

   A. Organization
   B. Planning
   C. Operational control
   D. Preparation

5. From what source is the basic information in the data base is derived?

   A. Work sequence and Gantt chart
   B. Proposal document and negotiated contract
   C. Policy and procedures handbook
   D. Project budget document and funding agency guidelines

6. What method is most often used to communicate information to personnel about project status?

   A. Workshops
   B. Orientation programs
   C. Newsletter and briefings
   D. Report forms and charts

7. Why does the project data base have to be continuously updated?

   A. To keep up with changes often made in schedules, costs, and performance
   B. To make a better project final report
   C. To keep the funding agency up-to-date
   D. To save project records

8. In addition to showing authority and responsibility for project staff, what else can an organizational chart show?

   A. Work yet to be accomplished
   B. Flow of information to decision centers
   C. Work in progress
   D. Critical areas of current work

9. The process of developing an organizational chart is similar to what special process in the project planning phase?

   A. Work flow development
   B. Resource estimation
   C. Schedules establishment
   D. Project definition

10. Why are management responsibility guides often developed?

   A. to facilitate scheduling
   B. To show budget reporting procedures
   C. To establish the authority and responsibility for project activities
   D. To assist in personnel recruitment

Indicate whether the statements listed below are true or false by writing a T or F on the line.

11 _____The central component in project information system is the project budget.

12. _____Data regarding actual and planned project status are of little value unless made readily available to the project funding agency.

13. _____One of the criteria for a good report form or chart is that, it should be graphical.

14. _____The management responsibility guide is a useful device to insure that project tasks are not overlooked.

15. _____The project information system enables the project manager to know who has the authority and responsibility to take corrective action.

Turn the page and check your answers.

Lesson 8--Project Information System

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 8 pretest are listed down the right margin. The left column is for the first page, the right column is for the second. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the project information system and should read the lesson abstract and content outline beginning on page 8.7. Then begin the tape-slide presentation by turning to the instructions on page 8.10.

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the project information system and should read the lesson abstract and outline on page 8.7. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 8.17. If you do desire to view the tape-slide presentation turn to the instructions on page 8.10.

Multiple Choice

1. C
2. B
3. D
4. C
5. B
6. D
7. A
8. B
9. D
10. C

True/False

11. F
12. F
13. T
14. T
15. T

Lesson 8--Project Information System

Lesson Abstract and Content Outline

ABSTRACT

Developing a project information system is an early activity in managing a project. This information system includes a project data base, organizational charts and documents, and a procedures handbook. Work sheets of schedule, cost, and performance are inputs to the data base as well as information from the proposal plan document and the negotiated contract. Task assignments, responsibility appointments, and updated progress of work are inputs to the information system; reports to the project director and to other organizations are outputs of the information system.

CONTENT OUTLINE

A. The project information system serves to:

   1. Reflect actual progress against planned project status at any given time.

   2. Provide a means for general communication as well as specific techniques of reporting.

B. The components of a project information system are:

   1. Data base

   2. Organizational chart and related documents

   3. Project handbook or manual

C. The data base is developed using a number of principles.

   1. The data to be included come from planning decisions concerning the time, cost, and performance for the various tasks.

   2. The proposal document and negotiated contract are used as a data source.

   3. The data base will be dynamic, not static, to reflect changes in project operations.

4. Written records are developed for each task showing time, cost, and performance data.

5. Processing of data can be done manually or by computer depending on the degree of complexity.

6. A decision concerning the use of a computer involves factors such as:

   a. Project complexity

   b. Project duration

   c. Project type

   d. Report frequency

   e. Costs

   f. Facilities available

7. Reports are the principal vehicle for presenting data and information to the project director and staff.

D. Organizational charts and related documents are developed using a number of principles.

1. The Project Organizational chart is created to show authority and responsibility patterns and to identify decision centers.

2. The Written Job Descriptions are derived from the organizational chart and typically show:

   a. Position title

   b. Duties

   c. Responsibility and authority

3. Management Responsibility Guides are constructed in matrix form to show authority and responsibility for project tasks.

   a. The columns usually represent positions.

   b. The rows usually show tasks.

   c. The matrix cells indicate the level of authority and responsibility.

4. Flow and Process Charts are developed to reflect movement of data and reports in and out of project decision centers.

E. The project handbook or manual is a basic element of the information system.

1. The handbook contains the organizational chart, flow charts, responsibility guides, and policy and procedures statements.

2. The handbook is revised as components of project information system are modified.

F. A project information system is essential to operational control of a project.

Turn the page for presentation instructions, or if going directly to the lesson exercises, turn to page 8.17.

Lesson 8--Project Information System

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the slide marked Module 2--Basic Principles and Techniques of Project Management, Lesson 8--Developing the Project Information System.*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 8--Project Information System

Lesson Text

Introduction

The previous lesson was concerned with project preparation activities such as acquiring personnel, equipment, materials and supplies, and space facilities. This lesson is concerned with the second major task of developing a project information system.

Successful operation of the project, once underway, depends to a great degree upon the project manager and his staff knowing what should be happening on the project, what is actually happening, and who should make it happen. This is usually accomplished with a procedure or operation commonly identified as a project information system. This system can be considered as having three components or sub-systems. They are the project data base, organizational charts and the project handbook. Data base and organizational charts are discussed below in more detail. The project hadbook was discussed in the previous lesson.

Project Data Base

The basic function of the data base is to accumulate in one place all of the initial schedule, budget, and performance decisions made during the planning and negotiation activities. By this means, the project director can have ready access to the basic or initial planning decisions which reflect what should be happening in the project.

The information to be placed in the data base is usually derived from the proposal document and the negotiated contract. The more specific the desisions that one includes in the project data base, the greater the chances are that such data will be useful in managing the project. Specific data is usually included regarding project objectives and specifications, activity and event identification, work sequence and schedules, resource requirements, and the budget.

Project objectives and specifications refers to statements of objectives to be reached and products to be produced, along with the standards and specifications for their achievement. Schedule data should include initial decisions reflecting such items as calendar dates for the start of the project, major milestone points, duration of tasks, project completion dates, and similar time-related data. Budget or cost information should include dollar amounts allocated to personnel, travel, facilities, equipment, and other major cost categories over the duration of the project.

It is important to understand that the number of items in the data base is likely to expand during the project life cycle, reflecting the expansion of work and activities once the project is underway. Thus, the data base is considered to be a dynamic, not a static, entity.

In relatively small projects, the project director might be able to keep all of the performance, schedule and budget data in his head. In large projects, however, some form of written record should be made of the initial data base items and their updated version. In addition to being of immediate aid to the project manager and his staff, written records are advantageous in creating project reports. The written records should include work sheets which assemble together the data for each work package or task in the project and cover the basis dimensions of schedule, cost and performance.

In addition to written forms and records which are maintained by hand, computer programs have been developed to process selected dimensions of a project data base. The dimension most commonly maintained by means of a computer has been information relating to the project shcedule. The second dimension most commonly handled by computer is that of budget. Daily, weekly and monthly reports and summaries of schedule and/or budget status are often routinely prepared by the parent organization housing the project. An example of such a report would be the monthly project budget statement issued by the business office of a school district. Several factors should be considered in determining whether or not a particular project should utilize a computer as a means of maintaining the data base. Among these factors are project complexity, duration and type; the desired report frequency; the availability of computer facilities; and the cost involved.

Regardless of how changes in project status are maintained, manually or by computer, data regarding actual and planned project status at any time are of little value unless made readily available to the project manager and his staff. Report forms and charts are the typical method used to communicate information to project personnel about the status of the project at given times. Three criteria for a good report form or chart are, that it should be graphical, should clearly illustrate the actual project status against the planned status, and should identify areas in which problems are developing and their impact on future project effort.

Within most organizational settings, reports relating to actual budget status are routinely supplied by the business office. Reports relating to schedule and performance, however, are left to the project staff to develop and use for management purposes. Regardless of the scale of schedule, budget, and performance involved, the data base should be updated continually to show accomplishments to date, work in progress, and future work. Using report forms which reflect updated project status, as derived from the data base, the project personnel have a means of knowing the exact status of the project at any given time.

Organizational Chart

The second component of the project information system involves the development of a project organizational and responsibility chart. The function of an organizational chart is to show authority and responsibility for project staff and to show reporting channels for the flow of information.

In general, an organizational chart is developed by sub-dividing major project authority and responsibility into lesser, or smaller, units in much the same manner as the project work breakdown structure was developed. Each of these units, large or small, can be thought of as a decision center for the project. In developing the chart, it is common practice to show the relation of the project to the overall local district organizational structure. An example of a project organizational chart is presented in Figure #1.

Once the organizational chart is established, a description is written for each role, function or position in the chart. The description should include the title, duties, and responsibility and authority patterns for each position. An organizational chart can be supplemented by flow or process charts which reflect the vertical and horizontal flow of reports and information to and from the several decision units, or centers, in the project organization.

In order to clarify project authority and responsibility lines, management responsibility guides are often developed. A management responsibility guide is usually constructed in matrix form by placing position titles on the columns, and tasks and functions down the side. Standard symbols are then placed in the cells to indicate responsibility for notification, advisement, decision, and other actions. The management responsibility guide is a useful device in preventing project tasks from being overlooked because no one is charged with the authority

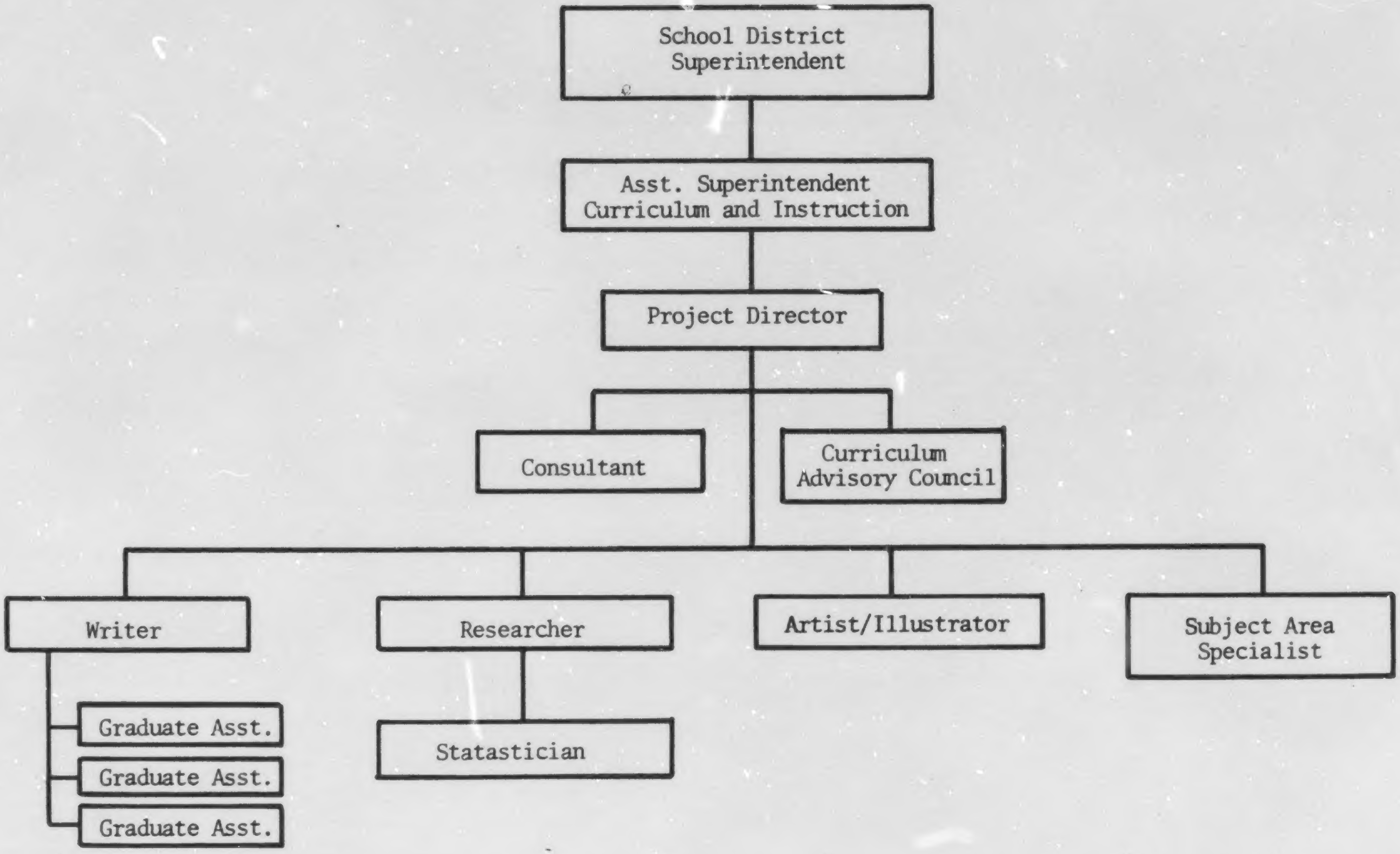

School District Superintendent
Asst. Superintendent Curriculum and Instruction
Project Director
Consultant
Curriculum Advisory Council
Writer
Researcher
Artist/Illustrator
Subject Area Specialist
Graduate Asst.
Graduate Asst.
Graduate Asst.
Statastician

Figure #1--Example of a Project Organizational Chart

POSITION TITLES

TASKS	Project Director	Consultant	Curriculum Advisory Council	Writer	Graduate Assistants	Researcher	Statistician	Artist/Illustrator	Subject Area Specialist
A	G	Y	Y	O	S			S	S
B	G					O	S		
C	G	Y	Y	O	S			S	S

Responsibility Relationship Codes

G - General Responsibility	S - Specific Responsibility
O - Operating Responsibility	Y - May Be Consulted

Figure #2--Example of Management Responsibility Guide or responsibility for their execution. An example of a management responsibility guide is presented in Figure #2.

The organizational chart and responsibility guide work together to identify who needs what data in order to make effective decisions which will move the project toward successful completion. Once developed, the data base, the organizational chart, and responsibility guides are assembled into the project handbook, discussed in the previous lesson.

Summary

To summarize, successful operation of a project is dependent upon the project manager's ability to know what should be happening and what is actually happening. The project information system enables him to carry out this function with ease. It enables him to know where problems exist in the project, how serious they are and who has the authority and responsibility to take corrective action. The value of having a well-developed project information system will be demonstrated in the next series of lessons, which outline the principles and procedures of project control.

Turn the page and read the directions for Exercise A.

Lesson 8--Project Information System

Exercise A--Developing Information Systems

Directions: Using the proposal document included in Lesson 7, answer the questions below by supplying the information requested.

A. How would you rate the proposal document (as now written) in terms of its usefulness in supplying basic data for the Project Management Data Base?

____1. Exceptionally useful
____2. Above average
____3. About average
____4. Below average
____5. Little or no use

B. The proposal provides the most detailed and useful data in which of the following dimensions of project data?

____1. Schedule
____2. Budget
____3. Performance

C. The proposal provides the least detailed and useful data in which of the following dimensions of project data?

____1. Schedule
____2. Budget
____3. Performance

D. For each item listed below, indicate whether or not the proposal presents data/information about the item.

		Available	Not Available
1.	Proposed start date	____	____
2.	Number of instructional aids	____	____
3.	Specialized reading tests	____	____
4.	Standards for accomplishment of objectives	____	____
5.	Number of parent orientations	____	____
6.	Schedule date for post-tests	____	____
7.	Qualifications of itinerant reading teacher	____	____
8.	Specifications for attitude inventory	____	____

Turn the page and check your responses.

Lesson 8--Project Information System

Exercise A--Solution

Directions: The solution to Exercise A is given below. Correct your work.

A. How would you rate the proposal document (as now written) in terms of its usefulness in supplying basic data for the Project Management Data Base?

- 1. Exceptionally useful
- 2. Above average
- 3. About average
- 4. Below average
- [✓ 5. Little or no use]

B. The proposal provides the most detailed and useful data in which of the following dimensions of project data?

- 1. Schedule
- [✓ 2. Budget]
- 3. Performance

C. The proposal provides the least detailed and useful data in which of the following dimensions of project data?

- [✓ 1. Schedule]
- 2. Budget
- 3. Performance

D. For each item listed below, indicate whether or not the proposal presents date/information about the item.

	Available	Not Available
1. Proposed start date		✓
2. Number of instructional aids	✓	
3. Specialized reading tests	✓	
4. Standards for accomplishment of objectives		✓
5. Number of parent orientations		✓
6. Schedule date for post-tests		✓
7. Qualifications of itinerant reading teacher		✓
8. Specifications for attitude inventory		✓

Turn the page and read the directions for Exercise B.

Lesson 8--Project Information System

Exercise B--Developing an Organizational Chart

Directions: The proposal used in the previous lesson needs some corrections in order that it can be used to specify project responsibilities and organization. Use the project budget shown below instead of the one in the previous lesson. An abbreviation for personnel roles in the project are shown below immediately following the position title. After reading this budget, turn the page and begin the exercise.

INSTRUCTIONAL (200)		Salaries	Others	Totals
210	Project Manager (PM)	$12,000		
211	Communication Specialist (CS)	10,800		
212	Reading Supervisor (RS)	10,800		
213	5 Reading Teachers (RT)	46,000		
218	5 Teacher Aides (TA)	15,000		
222	Materials and Supplies		$13,369	
224	Audio-Visual Materials		2,000	
	TOTAL INSTRUCTIONAL			$109,969
FIXED CHARGES (800)				
831	Retirement		9,460	
832	FICA		4,730	
834	Insurance		1,600	
	TOTAL FIXED CHARGES			15,790
	TOTALS	$94,600	$31,159	$125,759

Lesson 8--Project Information System

Exercise B--Worksheet

Directions: Using the proposal document included in Lesson 7 and the abbreviated titles of personnel shown on the previous page, assign staff to the various responsibilities indicated below.

The responsibilities involved in the project are listed as:

Position

______ 1. managing the project

______ 2. developing of program brochure

______ 3. speaking to school and community groups

______ 4. working in regional, state, and national conferences

______ 5. releasing news articles to news media

______ 6. planning reading activities

______ 7. teaching reading

______ 8. organizing the reading materials center

______ 9. operating the resource center (day-to-day)

______ 10. maintaining individual students skill mastery and behavioral records

______ 11. developing student before and after attitude test

______ 12. administering placement, achievement, and attitude tests

______ 13. developing teacher and aide response journals

______ 14. maintaining teacher and aide response journals

______ 15. coordinating with supportive services

______ 16. developing and operating the inservice training program

______ 17. involving parents in the reading program

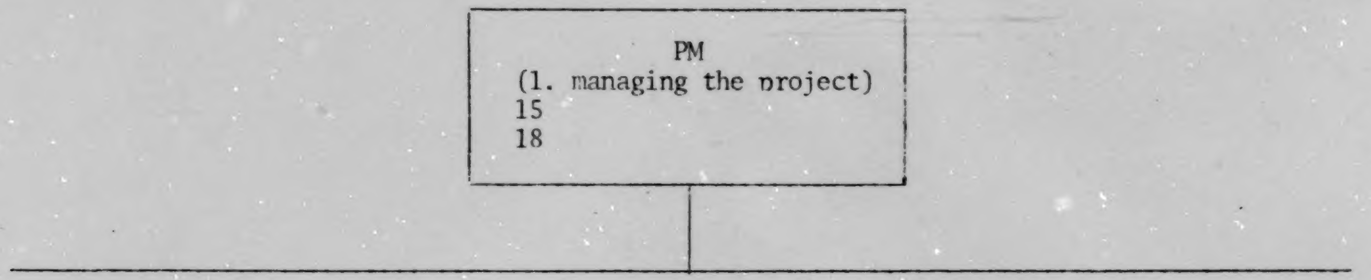
______ 18. ordering supplies and equipment

Turn the page and proceed.

Lesson 8--Project Information System

Exercise B--Worksheet

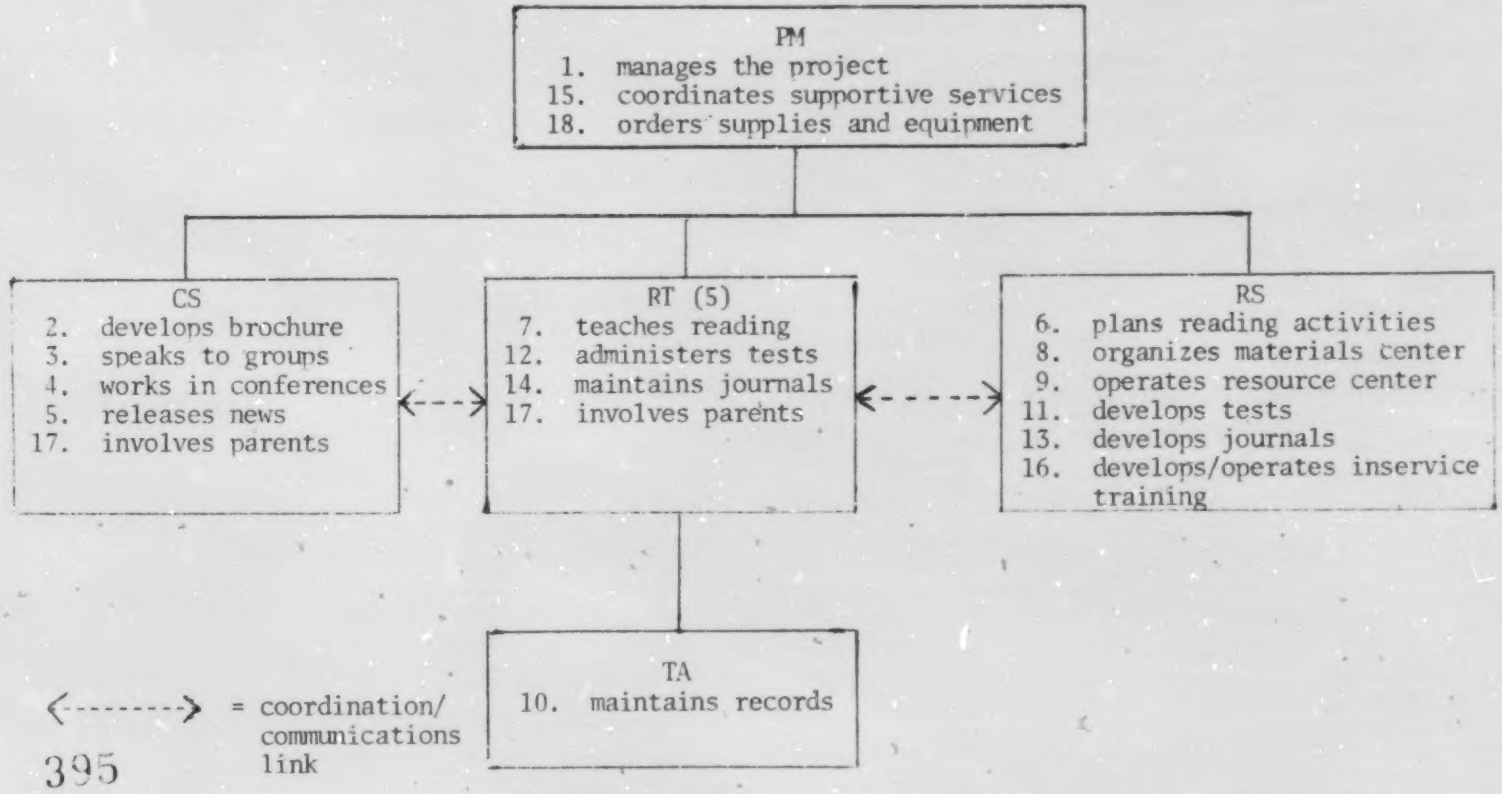
Directions: Develop an organizational chart which shows the lines of responsibility such that the 13 positions (roles) are shown and the 18 responsibilities are accounted for by the items listed in the chart. Use the underlined words from the responsibilities list on page 8.20 and the abbreviated titles of personnel shown on page 8.19. When finished, turn the page.



Lesson 8--Project Information System

Exercise B--Solution

Directions: A suggested project organization chart is presented below. Compare your chart with it. Correct as necessary.



PM
1. manages the project
15. coordinates supportive services
18. orders supplies and equipment

CS
2. develops brochure
3. speaks to groups
4. works in conferences
5. releases news
17. involves parents

RT (5)
7. teaches reading
12. administers tests
14. maintains journals
17. involves parents

RS
6. plans reading activities
8. organizes materials center
9. operates resource center
11. develops tests
13. develops journals
16. develops/operates inservice training

TA
10. maintains records

<------> = coordination/communications link

Turn the page and proceed.

Lesson 8--Project Information System

Directions and Choices Following the Practice Exercises

Based upon the self-evaluation of your performance on the exercise, you have either:

A. acceptably satisfied the objective of developing a project organization chart, and should now turn to the post-test found on page 8.24.

An additional example on developing project information systems is found on page 8.27. References for additional reading are listed on page 8.28.

B. not satisfied the objective, and should select one or more of the following courses of action.

1. View the slide-tape presentation; instructions are on page 8.10. After the presentation, rework exercises A and B on page 8.17.
2. Read the lesson narrative beginning on page 8.11, then rework exercises A and B on page 8.17.
3. Study the additional example on page 8.27, and then rework exercises A add B beginning on page 8.17.
4. Read Chapters Three and Eleven of Educational Project Management by Desmond L. Cook and then rework exercises A and B beginning on page 8.17.
5. Rework exercises A and B beginning on page 8.17.

Lesson 8--Project Information System

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

1. From what source is the basic information in the data base is derived?

   A. Work sequence and Gantt chart
   B. Proposal document and negotiated contract
   C. Policy and procedures handbook
   D. Project budget document and funding agency guidelines

2. What is the basic or principal function of the project data base?

   A. To collect information for writing the project final report
   B. To accumulate information regarding the budget
   C. To accumulate background information about funding source operations
   D. To accumulate in one place all of the schedule, budget and performance decisions made during the planning phase

3. A well structured, organized and presented data base facilitates work in what phase of the project life cycle?

   A. Organization
   B. Planning
   C. Operational control
   D. Preparation

4. What is the principal purpose or function of the project information system?

   A. To aid in the development of a project proposal
   B. To serve as a basis for progress reporting
   C. To assist in acquiring materials
   D. To aid in the development of the negotiated contract

5. What is the commonly identified procedure or operation used in knowing what is happening in the operation of a project?

   A. Project proposal
   B. Project budget
   C. Project information system
   D. Project final report

6. The process of developing an organizational chart is similar to what special process in the project planning phase?

   A. Work flow development
   B. Resource estimation
   C. Schedules establishment
   D. Project definition

7. Why are management responsibility guides often developed?

   A. To facilitate scheduling
   B. To show budget reporting procedures
   C. To establish the authority and responsibility for project activities
   D. To assist in personnel recruitment

8. Why does the project data base have to be continuously updated?

   A. To keep up with changes often made in schedules, costs and performance
   B. To make a better project final report
   C. To keep the funding agency up-to-date
   D. To save project records

9. In addition to showing authority and responsibility for project staff, what else can an organizational chart show?

   A. Work yet to be accomplished
   B. Flow of information to decision centers
   C. Work in progress
   D. Critical areas of current work

10. What method is most often used to communicate information to personnel about project status?

   A. Workshops
   B. Orientation programs
   C. Newsletter and briefings
   D. Report forms and charts

Indicate whether the statements listed below are true or false by writing a T or F on the line.

11. _____ Data regarding actual and planned project status are of little value unless made readily available to the project funding agency.

12. _____ One of the criteria for a good report form or chart is that, it should be graphical.

13. _____ The central component in project information system is the project budget.

14. _____ The project information system enables the project manager to know who has the authority and responsibility to take corrective action.

15. _____ The management responsibility guide is a useful device to insure that project tasks are not overlooked.

Turn the page and check your answers.

Lesson 8--Project Information System

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 8 post-test are listed down the right margin. The left column is for the first page, the right column is for the second. Check your correct responses.

Directions: If you answered twelve or less questions correctly, you have not acceptably demonstrated knowledge of the process of developing the project information system and should select one or more of the following courses of action.

1. *View the slide-tape presentation by turning to page 8.10 and proceeding. After the presentation turn to the Lesson Quality Control Form on page 8.29.*
2. *Read the lesson narrative beginning on page 8.11. Then turn to the Lesson Quality Control Form on page 8.29.*
3. *Read Chapters 3 and 11 of* Educational Project Management *by Desmond L. Cook, and then turn to the Lesson Quality Control Form on page 8.29*
4. *Study the additional example beginning on page 8.27, and then turn to the Lesson Quality Control Form on page 8.29.*
5. *Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 8.29.*

Directions: If you answered thirteen or more questions correctly, you have acceptably demonstrated knowledge of the process of developing the project information system and should now turn to the Lesson Quality Control Form on page 8.29. An additional example on developing the project information system is found on page 8.27. References for additional reading are listed on page 8.28.

Multiple Choice

1. B
2. D
3. C
4. B
5. C
6. D
7. C
8. A
9. B
10. D

True/False

11. F
12. T
13. F
14. T
15. T

Lesson 8--Project Information System

Additional Example

An instructional development project of the Metropolitan City Schools began on the scheduled date with a staff consisting of a Project Manager, Public Relations Specialist, Evaluation Specialist, and Instructional Design Specialist. The staff reviewed and modified the project task breakdown structure. Subsequently they assigned the tasks to appropriate staff persons or made arrangements for consultants' services. The task assignments or responsibilities, and the staff organization was then made visual by constructing the responsibility chart shown in part as follows:

Project Manager
Managing the Project

Instructional Design Specialist	Evaluation Specialist	Public Relations Specialist	Consultants
Performing task analysis of type 1 technician	Forming program evaluation plan	Developing PR plan	Auditing the project plan
Writing instructional objectives for program developing training	Developing in-the-field technician survey	Contacting community news media	Assisting in writing program objectives
Designing program	Writing pretest instrument	Writing prototype news releases	⋮
⋮	⋮	⋮	

Lesson 8--Project Information System

Reading References

Additional knowledge about the project information system may be obtained by reading from the references cited below.

Archibald, Russell D. and Richard L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, Chapter 2.

Baumgartner, John S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 3.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapters 3 and 10.

Woodgate, H. S. Planning by Network, second edition. London, England: Business Publications, Ltd., 1967, Chapter 7.

Lesson 8--Project Information System

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

   ☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 8--Project Information System

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on project information system is now completed. Turn the page and read the directions for Phase Test 2.

PHASE TEST 2

Project Preparation Phase

Directions: The following pages contain a series of items in a variety of formats which are designed to assist you in assessing the knowledge you have acquired from Lessons 7 and 8 of Module 2. This set of items gives emphasis to cognitive abilities as contrasted to attitudes or skills.

The expectation is that you should answer all items correctly in order to consider your learning in this phase as being complete. In this sense, the test can be considered as a mastery test, a minimum essentials test, or a criterion-referenced test.

Read each item carefully. Record your answers on the separate answer sheet immediately after this page. After you have completed the last item, review your responses, then turn to page 22 which contains the answers for the several phase tests and check your choices against the answers presented there.

Turn the page and begin.

Answer Sheet

for

Project Preparation Phase

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
11. A B C D
12. A B C D
13. A B C D
14. A B C D
15. A B C D
16. A B C D
17. A B C D
18. A B C D
19. A B C D
20. A B C D

Phase Test

for

Preparation Phase

Directions: Read the directions for each section carefully and respond as indicated. After completing the test, turn to the module manual to check your answers.

Items 1 through 5. Listed below to be used as responses for the items indicated are four elements of the project management information system. Match the activity listed with the proper element.

A. Organizational chart
B. Management Responsibility Guide
C. Data Base
D. Handbook

1. Approval of final report.

2. Schedule date for completion of a product.

3. Signatures necessary for approval of travel.

4. Outline for reporting format and procedures.

5. Individual to whom the project manager reports.

The next set of items should be answered as Yes or No. Mark A on the answer sheet if Yes; mark B if No.

6. The project proposal should specify the types of skills needed by each person who is proposed to work on the project.

7. Proposals are accepted by a funding agency in the format and content as originally developed.

8. Each person on the project should be given a statement of his duties, responsibilities, authority, and related information.

9. The implementation plan should include a list of equipment needed for the project.

10. Needed orientation and training sessions for project staff members are conducted by the agency in which the project is housed.

The next set of items is in choice format. Select your response and mark the appropriate letter on the answer sheet.

11. Optimum program management is a combination of the management of what three principal elements of information?

    A. Planning, controlling, organizing.
    B. Cost, time, performance.
    C. Men, material, missions.
    D. Ideas, actions, results.

12. What are the basic comparisons made in the typical project management information system?

    A. Actual costs to actual tasks.
    B. Estimated times to actual times.
    C. Actual costs and task times.
    D. Estimated tasks and estimated times.

13. What is the basic function of a management information system in a project?

    A. Communicate the decisions of the management to the performance levels of the project.
    B. Establish a data base for the planning stages of the project.
    C. Provide the manager with information relevant to the time, cost, and performance factors.
    D. Provide the manager with progress reports from all levels of the project.

14. Where would one look for data or information with regard to equipment needed for the project?

    A. Budget section of proposal.
    B. Policy and Procedures Handbook.
    C. Organizational chart.
    D. Management Responsibility Guide.

15. What is the basic function or purpose of the Management Responsibility Guide?

    A. To identify appropriate actions to be taken by each person.
    B. To assign costs to persons working on the project.
    C. To identify the end products of the project.
    D. To state the conditions of employment.

16. Where would one expect to find information on retirement and benefits for the project personnel?

    A. Organizational chart.
    B. Data information base.
    C. Policy and Procedures Handbook.
    D. Project Management Office.

17. What would not normally be included as an item of project equipment?

    A. Reading accelerator or pacer.
    B. Duplication supplies.
    C. Typewriter.
    D. Case to carry overhead transparencies.

18. When should the implementation or preparation plan be developed?

    A. When notice of funding is received.
    B. Only after the official contract is signed.
    C. Upon authorization by the Superintendent to proceed.
    D. When the proposal is submitted.

19. What dimensions are usually exhibited on a Management Responsibility Guide?

    A. Project personnel and tasks.
    B. Tasks and organizational agencies outside of the project.
    C. Tasks and events.
    D. Persons and budget expenditures.

20. Who should receive copies of the policy and procedures handbook?

    A. Project staff.
    B. Project staff plus related persons.
    C. Project Manager only.
    D. Contractor only.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 9 -- Project Operations -- Monitoring and Control

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 9--Project Operations--Monitoring and Control

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to lesson 9.1
Overview and objectives. 9.2
Pretest. 9.3
Lesson abstract and content outline. 9.5
Lesson text. 9.7
Exercises on problem identification. 9.13
Post-test. 9.23
Additional example 9.25
Reading references 9.28
Lesson Quality Control Form. 9.29

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 9--Project Operations--Monitoring and Control."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 9--Project Operations--Monitoring and Control."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 12 minutes, the exercise takes approximately 60 minutes, and about 90 minutes is needed to complete the entire lesson.

Lesson 9--Project Operations--Monitoring and Control

Overview and Objectives

OVERVIEW

The previous lesson was concerned with the establishment of the project information system. Providing for the storage and subsequent use of information pertinent to the operation of the project was emphasized.

This lesson is concerned with the first step of project operational control--problem identification. Problems in the operation of a project are identified by comparing the actual status of the project with the planned status indicated originally in the project information system. The next lesson is concerned with the development and selection of alternative solutions to the identified problems.

OBJECTIVES

The student in completing this lesson should be able to identify differences between the actual status and planned status of a project in terms of time, cost, and performance. Specifically, the objectives of the lesson are:

1. The student should be able to specify the type of information needed in a project status report in order to identify time, cost, and performance deviations.

2. Given a project status report, the student should be able to specify deviations from the project plan in terms of time, cost, and performance.

Complete the pretest on the following page.

Lesson 9--Project Operations--Monitoring and Control

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_____________.

1. What major activities comprise the operational control phase of the project life cycle?

   A. Problem identification and estimating budget
   B. Constructing resource schedule and preparing time estimates
   C. Developing project procedures and preparing work flow diagrams
   D. Problem identification and corrective actions

2. What is the first step in applying the control concept in the operations phase of a project?

   A. Problem solution
   B. Problem identification
   C. Problem analysis
   D. Progress reporting

3. The basic function of a reporting system is to present the project manager with a current view of what project conditions?

   A. Actual situation and planned status
   B. Planned situation and project proposal
   C. Past situation and present status
   D. Planned situation and negotiated contract

4. What is the commonly accepted management definition of a problem?

   A. An unanswerable question
   B. A deviation from plan
   C. A decision to be made
   D. A lack of staff initiative

5. What is the foundation for problem identification in a project?

   A. Budget document
   B. Project schedule
   C. Project handbook
   D. Project plan

6. How can control be most effectively exercised during the life cycle of a project?

   A. Constructing network diagrams
   B. Developing many evaluation reports
   C. Identifying points of accomplishment to be monitored
   D. Measuring the behaviors of staff

7. What is the first step usually followed by the project manager in the operational control phase in order to insure that most serious problems are solved first?

   A. Preparing a priority ranking of the alternatives
   B. Preparing a priority ranking of the deviations
   C. Developing a project information system
   D. Implementing the project reporting system

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. _____ Control is basically a problem solving process.

9. _____ The control process recycles sometimes through the life of a project.

10. _____ Progress reports should always be in written form.

11. _____ The time inherent in oral reporting can be minimized by adopting briefing techniques.

12. _____ For a project control points are calendar dates, dollar allocations, and performance specifications.

13. _____ The criteria used to establish both standards and limits depends only upon the project contract.

14. _____ The method of employing standards and bounds creates a rationale for judging the significance of a deviation.

Check your answers on the following page.

Lesson 9--Project Operations--Monitoring and Control

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 9 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of problem identification and should read the lesson abstract and content outline on page 9.5. Then begin the tape-slide presentation by turning to the instructions on page 9.6.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of problem identification and should read the lesson abstract and content outline on page 9.5. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercisess beginning on page 9.13. If you do desire to view the tape-slide presentation, turn to the instructions on page 9.6.

Multiple Choice

1. D
2. B
3. A
4. B
5. D
6. C
7. B

True/False

8. T
9. F
10. F
11. T
12. T
13. F
14. T

Lesson 9--Project Operations--Monitoring and Control

Lesson Abstract and Content Outline

ABSTRACT

Problem identification through management reports is the first step in the three-step, problem-solving process called control. Problem identification is dependent upon a reporting system which provides information on the past, present, and projected status of the project work effort. Deviations between the planned situation and the actual situation represent management problems. Deviations are discovered by making time, cost, and performance measurements and specified points in the life of a project.

CONTENT OUTLINE

A. Control is a cyclical, three-step problem-solving process that includes problem identification, the creation and selection of alternative problem solutions, and solution implementation.

B. A reporting system which provides written and oral information is needed in order to exercise management control.

C. Control information is usually provided in the form of progress reports which include past, present, and projected information on the status of the project work effort.

D. The essence of problem identification is the comparison of the planned situation with the actual situation.

E. When a deviation between "shoulds" and "actuals" is found, a project management problem has been found.

F. Deviations are identified by making time, cost, and performance measurements at specified points in the life of a project.

G. Time, cost, and performance standards and permissable bounds for deviation should be specified prior to measurement.

H. Identified deviations should be listed in priority order on the basis of their likelihood to impede the progress of the project.

Lesson 9--Project Operations--Monitoring and Control

Instructions

1. *Set up the recorder, projector, and screen.*

2. *Place the carousel slide tray onto the projector and advance the tray to the start of "Basic Principles and Techniques of Project Management, Lesson 9--Project Operations--Monitoring and Control."*

3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*

4. *Start the recorder and advance the slides with the "change tone."*

Lesson 9--Project Operations--Monitoring and Control

Lesson Text

Introduction

After a project has been planned, the proposal written, the funds authorized and the start-up plan executed, the actual operation of the project begins. One has to assume that the plan for the project is designed to optimize the operation of the project. During the planning phase many alternative means were considered and the best course for the project was selected.

Regardless of the best planning and preparation effort, operations do not always go as planned. Thus, the project director must have a system or procedure for knowing the status of the project at all times. The informaton system discussed in the previous lesson can be useful in this regard. Operational problem identification and corrective actions make up the major activities of the third phase in the project life-cycle--operations phase. Lessons 9, 10 and 11 are concerned with this phase.

What is meant by the concept of operations monitoring and control? This process is basically a problem-solving process which can be conveniently divided into three basic steps. The first step is the identification of a problem, utilizing the plan as a guide. The second step is the development of alternative solutions to correct the problem and the selection of the most desirable solution. The third step is the implementation of the desired solution and the communication of changes in operations to the project staff and other affected offices. This three-step control process is repeated throughout the operations phase of the project. In order to further explain this monitoring process, the steps will be presented sequentially in this and subsequent lessons.

Reporting System

A basic element of the operations phase is a progress reporting system. Such a system enables the project director to determine how the project activities are proceeding, i.e., determine the current status of project operations at various intervals. Establishing a progress reporting system involves creating reporting forms and procedures designed to furnish project status information. The project manager and his staff must decide on the type, content, format, and frequency of these reports. They must also specify who is to receive which report.

Progress reports can be written or oral, or both. Some reports, such as accounting records and inventory reports, are usually written, since they contain a large amount of detailed information. Written reports, however, do not necessarily have to contain a large amount of information. They can consist of a single sheet with appropriate boxes checked to indicate task, or project, status. Project progress reports should indicate the activities completed or the events that have occurred to date. They can also contain a reestimation of the time and cost required to finish activities that are in progress or that will take place in the future, as well as any changes in performance standards. As progress reports are received from the project staff, any time, cost and performance information contained in the reports must be incorporated into the project information system.

Oral reports, such as those presented in staff meetings, can also provide necessary management information. An important advantage of oral reports is that they provide a means for immediate feedback and an opportunity to pursue a question about the status of a task in detail by raising questions. Also, because of their informality, they may aid the project manager in becoming better acquainted with his staff. The time needed for oral reporting can be minimized if briefing techniques are utilized.

Deviation Identification

Regardless of the form of the report, its basic function is to present the project manager with information comparing the actual to-date progress with the planned progress in terms of schedule, budgets, and performance. If a report indicates that there is no discrepancy between the actual status and the planned situation, then project operations are moving smoothly. If, however, a report indicates that there is a divergence, then a deviation is said to exist. From a project management point of view, this deviation or difference between the project plan (the should's) and what is actually happening (the actual's) is called a problem. Deviations or problems can be categorized into either positive or negative -- in the former, operations are going better than planned, while in the latter, they are not going as well as desired. Problems can occur in the schedule, budget or in task performance. That is, problems can be identified by noting deviation from the project time, cost and performance standards.

How does one identify such deviations during project operations? Since all project activities cannot be monitored simultaneously and continually, the project manager must monitor or measure progress at various critical points in the process. For example, the process of learning can be considered to a continuous operation. The monitoring of the learning process takes place at specific points, usually by employing some type of test.

For a project, such monitoring or control points involve calendar dates, dollar expenditures, and performance specifications. Standards and bounds are set for each monitoring or control point in the project. A standard is usually a specified level of performance, a scheduled date for the completion of a task, or an expenditure figure in dollars. A bound is the acceptable range of deviation (positive or negative) from the specified standard. It is important to have specified during the planning phase the tolerance or boundaries in project performance, time, and cost. It should be realized, however, that these standards and bounds are subject to change as the project progresses.

Standards and bounds for time, cost and performance should be established simultaneously. For example, the desired standards for a teacher behavioral rating scale prepared by a project evaluator might be "Have a reliability coefficient of .90, be ready by September 20, and cost $150 to produce." The boundaries at this control point might be characterized as "Have a minimum reliability figure of .85, be completed within two working days either side of September 20, and cost plus or minus $50 to produce."

Since a project can encounter difficulties if tasks are finished either earlier or later than the specified completion date, limits should be established for both sides of the time standard. Setting limits on both sides of the standard also applies to the areas of cost and performance. This insures that both positive and negative deviations can be identified. This method of employing standards and bounds creates a rationale for judging the significance of a deviation. If a deviation falls within the limits, then it is not as important or significant as a deviation which exceeds the limits.

The criteria used to establish both standards and bounds depends upon the project contract, local education agency constraints, the desires of the educational executive, and the requirements of the project director. The criteria used depend on the relative importance attached to time, cost, and performance. For example, if the project director feels it is most important not to overspend the budget, he might set more specific standards and closer limits on money spent than upon the project schedule and performance dimensions.

The project manager may elect to identify deviations himself by reviewing progress reports, or he may have his staff identify them in the reports. Since the project staff should be quite familiar with their own tasks, they may be better able to judge their progress than the project manager, provided they are given standards and limits from the project information system.

During the operation of a project, several deviations may exist simultaneously. In this case, the reporting system can be used to aid the project director in determining the cumulative effect of the several deviations. The system can also be utilized to list the deviations in terms of their likely impediment or facilitation of progress toward the achievement of the overall project goal. Such a list establishes a priority order for solving the most serious deviation problems first.

Summary

A basic step in the operations process involves developing a reporting system and utilizing the reporting system to describe the actual situation and comparing it with the plan in order to identify deviations or problems. The significance of the deviations can be determined and the deviations (or problems) can be ranked to establish a priority for solving the most serious problems first. The next lesson is concerned with methods to solve these problems.

Read the directions for Exercise A on the Following page.

Lesson 9--Project Operations--Monitoring and Control

Problem Setting for Exercises A, B, and C

Directions: Read the problem setting below. Then turn the page and complete the exercise.

PROBLEM SETTING

Metropolitan School District is conducting a curriculum project under contract with the National Science Foundation (N.S.F.). The project goal is to produce short science lessons geared to the local area. Climate, terrain and ecology are particular to certain geographical regions of the United States. The study of science in these regions can be facilitated if lessons are built to utilize the natural surroundings.

Geology, ecology, zoology, botony and other science areas which have specific application to the local area are to be utilized in lesson development. The lessons are to be designed for fifth and sixth grade students.

The project runs for a full year and is divided into six time periods. Lesson materials are to be sent to N.S.F. every eight weeks as they are developed. The project should produce 30 lessons--five lessons for each eight-week period.

The contract is such that the Metropolitan School District receives money each time five are received and accepted. The school system is not providing any additional funds, but is providing all facilities and start-up equipment. Special services are provided at a reduced price. The project is responsible for personnel, new equipment, and materials.

The project thus far has produced five lessons (A, B, C, D, and E) and is operating in the second time or work period. To simplify the problem, assume that you are only concerned with the second work period of the project. Personnel includes the project director and five lesson developers. Data from the first period indicates the work rate for the staff is that one person working full time can produce one lesson in eight weeks. This work rate also applies when several people work on the same lesson, i.e., two people can complete one lesson in four weeks. Assume that each staff member has a working knowledge in all of the science areas.

Lesson 9--Project Operations--Monitoring and Control

Exercise A

Directions: In your role as project director you receive the following status report during the second work period. Study the report and answer the question that follows.

PROJECT STATUS REPORT--SECOND WORK PERIOD

Work Status

Lesson	Current Status
Lesson F	Complete
Lesson G	Complete
Lesson H	3/4 Complete
Lesson I	1/2 Complete
Lesson J	1/2 Complete

Expenditures to Date

Item	
Projector Director	$ 1,800
Personnel (5 people)	7,500
Materials	700
Equipment	450
Special Services	300
TCTAL	$10,700

Turn the page.

Question: If you can identify any time, cost, or performance deviations, indicate them below. If you cannot, explain why not.

____

____

____

____

Turn the page and check your answer.

Lesson 9--Project Operations--Monitoring and Control

Exercise A--Solution

Directions: Your answer to Exercise A should approximate the solution given below. Read the solution and turn the page for Exercise B.

Question: If you can identify any time, cost, or performance deviations, indicate them below. If you cannot, explain why not.

Cannot. No plan is given with which you can compare the actual situation in order to identify deviations from the plan.

Lesson 9--Project Operations--Monitoring and Control

Exercise B

Directions: Using the project status report given in Exercise A, answer the question below.

Question: What information do you need in order to determine time, cost, and performance deviations.

a. ______________________________

b. ______________________________

c. ______________________________

d. ______________________________

Turn the page and check your answer.

Lesson 9--Project Operations--Monitoring and Control

Exercise B--Solution

Directions: Your answer to Exercise B should approximate the solution given below. Read the solution and turn the page for Exercise C.

Question: What information do you need in order to determine time and cost deviations?

a. *The date of the report.*

b. *The time schedule for completion of the lessons.*

c. *The budget and expenditure plan and limits for the work period.*

d. *Information indicating whether or not the completed lessons have met the lesson specifications.*

Lesson 9--Project Operations--Monitoring and Control

Exercise C

Directions: The project manager receives the following revised project status report. Study it and answer the question that follows.

PROJECT STATUS REPORT

Project Title: Curriculum Revision

Planned Duration: Eight weeks

Current Project Date: End of sixth week

Schedule and Performance Status

Item	Schedule		Performance		
	Planned Completion Date	Present Schedule Status	Planned Work Status	Present Work Status	Specification Review
Lesson F	8th week	ahead	3/4 complete	complete	ok
Lesson G	8th week	ahead	3/4 complete	complete	ok
Lesson H	8th week	on	3/4 complete	3/4 complete	
Lesson I	8th week	behind	3/4 complete	1/2 complete	
Lesson J	8th week	behind	3/4 complete	1/4 complete	

Financial Status

Item	Planned Expenditures for total project.	Planned Expenditures for 6 weeks	Current Expenditures	Permissible Deviation Limits
Project Director	$ 2,400	$ 1,800	$ 1,800	± 10%
Personnel (5 people)	12,000	9,000	7,500	± 10%
Materials	1,000	750	700	± 10%
Equipment	500	375	450	± 10%
Special Services	400	300	300	± 10%
TOTAL	$26,300	$11,225	$10,700	Not to be overspent

Turn the page.

Question: Briefly describe each of the deviations from the project plan that you can discover by comparing actual project status with planned status in the Revised Project Status Report on the previous page.

1. ____________________

2. ____________________

3. ____________________

4. ____________________

5. ____________________

Turn the page and check your answer.

Lesson 9--Project Operations--Monitoring and Control

Exercise C--Solution

Directions: Read the solution to Exercise C given below. Your answers should approximate those given. A brief explanation of the answers is provided to help clarify them.

Question: Briefly describe each of the deviations from the project plan that you can discover by comparing actual project status with planned status in the Revised Project Status Report.

1. *Lessons F and G were finished early. (They should only be 3/4 complete at this time.)*

2. *Work on Lesson I and J is behind schedule. (They should be 3/4 complete, but I is 1/2 complete and J is 1/4 complete.)*

3. *Budget item "personnel" is underspent and beyond permissible limits. (Should have spent $9,000 at this time.)*

4. *Budget item "materials" is underspent but within permissible limits. (Should have spent $750 at this time.)*

5. *Budget item "equipment" is overspent and beyond permissible limits. ($375 + 10% of $375 = $412.50, not $450).*

Turn the page and proceed.

Lesson 9--Project Operations--Monitoring and Control

Directions and Choices Following the Practice Exercises

Based upon the self-evaluation of your performance on the exercise, you have either:

A. *acceptably satisfied the objective of identifying problems in a project work effort and should now turn to the post-test found on page 9.23.*

An additional example on problem identification is found beginning on page 9.25. References for additional reading are listed on page 9.28.

B. *not satisfied the objective, and should select one or more of the following courses of action.*

1. *Study the additional example beginning on page 9.25, and then rework the exercises beginning on page 9.13.*
2. *Read Chapter Ten of Educational Project Management by Desmond L. Cook, and then rework the exercises beginning on page 9.13.*
3. *Rework the exercises beginning on page 9.13.*
4. *View the slide-tape presentation; instructions are on page 9.6. After the presentation, rework the exercises beginning on page 9.13.*
5. *Read the lesson narrative beginning on page 9.7, and then rework the exercises beginning on page 9.13.*

Lesson 9--Project Operations--Monitoring and Control

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the ture and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

1. What is the commonly accepted management definition of a problem?

   A. An unanswerable question
   B. A deviation from plan
   C. A decision to be made
   D. A lack of staff initiative

2. The basic function of a reporting system is to present the project manager with a current view of what project conditions?

   A. Actual situation and planned status
   B. Planned situation and project proposal
   C. Past situation and present status
   D. Planned situation and negotiated contract

3. What is the first step in applying the control concept in the operations phase of a project?

   A. Problem solution
   B. Problem identification
   C. Problem analysis
   D. Progress reporting

4. What major activities comprise the operational control phase of the project life cycle?

   A. Problem identification and estimating budget
   B. Constructing resource schedule and preparing time estimates
   C. Developing project procedures and preparing work flow diagrams
   D. Problem identification and corrective actions

5. How can control be most effectively exercised during the life cycle of a project?

   A. Constructing network diagrams
   B. Developing many evaluation reports
   C. Identifying points of accomplishment to be monitored
   D. Measuring the behaviors of staff

6. What is the first step usually followed by the project manager in the operational control phase in order to insure that most serious problems are solved first?

   A. Preparing a priority ranking of the alternatives
   B. Preparing a priority ranking of the deviations
   C. Developing a project information system
   D. Implementing the project reporting system

7. What is the foundation for problem identification in a project?

   A. Budget document
   B. Project schedule
   C. Project handbook
   D. Project plan

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. _____For a project control points are calendar dates, dollar allocations, and performance specifications.

9. _____Progress reports should always be in written form

10. _____The time inherent in oral reporting can be minimized by adopting briefing techniques.

11. _____The control process recycles sometimes through the life of a project

12. _____Control is basically a problem solving process.

13. _____The method of employing standards and bounds creates a rationale for judging the significance of a deviation

14. _____The criteria used to establish both standards and limits depends only upon the project contract.

Check your answers on the following page.

Lesson 9--Project Operations--Monitoring and Control

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 9 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of problem identification and should select one or more of the following courses of action.

1. View the slide-tape presentation by turning to page 9.6 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 9.29.
2. Read the lesson narrative beginning on page 9.7, and then turn to the Lesson Quality Control Form on page 9.29.
3. Read Chapter Ten of *Educational Project Management* by Desmond L. Cook, and then turn to the Lesson Quality Control Form on page 9.29.
4. Study the additional example beginning on page 9.25, and then turn to the Lesson Quality Control Form on page 9.29.
5. Rework the lesson post-test, and then turn to the Lesson Quality Control Form on page 9.29.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of problem identification and should now turn to the Lesson Quality Control Form on page 9.29. An additional example of problem identification is found on page 9.25. References for additional reading are listed on page 9.28.

Multiple Choice

1. B
2. A
3. B
4. D
5. C
6. B
7. D

True/False

8. T
9. F
10. T
11. F
12. T
13. T
14. F

Lesson 9--Project Operations--Monitoring and Control

Additional Example

Smithville Schools has been running a summer curriculum revision project in junior high mathematics. The goal of the project is to prepare course guides for use by teachers. A guide is to be prepared for mathematics 7, mathematics 8, general mathematics (GM), Algebra 1 (A1) and mathematics 7A (accelerated). The project staff includes the mathematics supervisor at half time (project director), six mathematics teachers at full time, and one secretary at full time. The project is planned to run for eight weeks. At the end of the fourth week the project director received the project status report appearing on the following page.

PROJECT STATUS REPORT

Project Title: Mathematics Course Guides

Planned Duration: Eight weeks

Current Project Date: End of the fourth week

Schedule and Performance Status

Item	Schedule		Performance		
	Planned Completion Date	Present Schedule Status	Planned Work Status	Present Work Status	Specification Review
Math 7 Guide	4th week	behind	complete	1/2 complete	not reviewed
Math 7A Guide	8th week	on	start 5th week	not started	not reviewed
Math 8 Guide	4th week	behind	complete	1/2 complete	not reviewed
GM Guide	6th week	on	1/2 complete	1/2 complete	not reviewed
AI Guide	8th week	on	start 5th week	not started	not reviewed

Financial Status

Item	Planned Expenditures for Total Project	Planned Expenditures for 4 weeks	Current Expenditures	Permissible Deviation Limits
Personnel	$14,600	$ 7,300	$ 6,800	± 5%
Equipment	600	300	285	± 10%
Materials and Supplies	1,000	500	400	± 10%
Indirect Costs	6,400	3,200	2,800	+ 10%
Grand Total	$22,600	$11,300	$10,285	Not to be overspent

After studying the above project status report, the project manager identified the following deviations from the project plan.

1. MATH 7 GUIDE is behind schedule.
2. MATH 8 GUIDE is behind schedule.
3. PERSONNEL is underspent and beyond the 5% permissible limit. [$7,300 - (.05 x $7,300) = $6,935, which is greater than $6,800 actual].
4. EQUIPMENT is underspent, but within the 10% permissible limit. [$300 - (.10 x $300) = $270, which is less than the $285 actual].
5. MATERIALS AND SUPPLIES is underspent and beyond the 10% permissible limit. [$500 - (.10 x $500) = $450, which is greater than the $400 actual].
6. INDIRECT COSTS is underspent and beyond the 10% permissible limit. [$3,200 - (.10 x $3,200) = $2,880, which is greater than $2,800 actual].

Having identified the above deviations or problem, the manager's concern was with determining what to do about it. Since the financial expenditures are not tied to the work performed in this typical project status report, it is difficult to immediately discover the cause of the problem. Discovering the cause of the problem, generating alternatives, and selecting a problem solution from among the alternatives is discussed in Lesson 10.

Lesson 9--Project Operations--Monitoring and Control

Reading References

Additional knowledge about problem identification can be obtained by reading from the references cited below:

Archibald, Russell D, and Richard L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1968, pp. 413-21.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapters 3, 4, and 10.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 10.

Woodgate, H. S. Planning by Network. London, England: Business Publications, Ltd., 1964, Chapter 9 and Chapter 12, pp. 272-89.

Lesson 9--Project Operations--Monitoring and Control

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

   ☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 9--Project Operations--Monitoring and Control

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on project operations is now completed. Lesson 10 entitled "Problem-Solving Through Management Action" is the next lesson in the sequence; you are advised to locate the lesson booklet and read the introductory pages.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 10 -- Problem-Solving Through Management Action

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 10--Problem-Solving Through Management Action

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

A. Booklet containing the following items

	Page
Introduction to lesson	10.1
Overview and objectives	10.2
Pretest	10.3
Lesson abstract and content outline	10.6
Lesson text	10.9
Exercises on problem-solving	10.20
Post-test	10.34
Additional examples	10.37
Reading references	10.39
Lesson Quality Control Form	10.40

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 10--Problem-Solving Through Management Action."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 10--Problem-Solving Through Management Action."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 15 minutes, the exercise takes approximately 30 minutes, and about 80 minutes is needed to complete the entire lesson.

Lesson 10--Problem-Solving Through Management Action

Overview and Objectives

OVERVIEW

The previous lesson developed the concept of problem identification during the operation of a project. This lesson presents procedures for analyzing the cause of problems and examining various alternative solutions. A rationale for weighing alternatives is given such that one alternative solution is indicated over the others. The next lesson deals with implementing the chosen solution.

OBJECTIVES

The student in completing the lesson should acquire knowledge about project control and its relation to problem-solving actions. The specific objectives of the lesson are as follows:

1. The student will be able to establish a set of needs/likes criteria useful in the selection of an alternative.

2. The student will be able to develop alternative courses of action for dealing with a deviation from the plan.

3. The student will be able to act upon the information secured for each alternative and choose the alternative most likely to remedy the problem situation or deviation from plan.

Lesson 10--Problem Solving Through Management Action

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated____________.

1. From the project management point of view, what is the first activity in decision-making?

   A. Specifying the causes of the problems
   B. Specifying the means for solving problems
   C. Specifying the results or ends that are to be achieved
   D. Developing the competencies of project staff

2. Should there be any restrictions on how many alternatives a project manager and his staff can develop initially in solving an operational problem? Why?

   A. Yes, because one alternative removes confusion
   B. Yes, since only two or three alternatives are likely to be useful or practical
   C. No, because projects require many alternatives
   D. No, since potential alternatives could be overlooked

3. What is the initial standard against which possible solution alternatives are judged?

   A. Statement of likes
   B. Statement of needs
   C. Staff Acceptability
   D. Project plan

4. Whom should the project manager primarily involve in developing potential alternative courses of action?

   A. All project staff
   B. Contracting agency program officer
   C. Project personnel familiar with the problem
   D. Departmental Supervisors

5. Will any time, cost and performance trade-off's occur in the development of alternative solutions?

   A. Yes, all three will be involved
   B. No, they are only of concern in the project planning phase
   C. No, they are only of concern in the project preparation phase
   D. No, they can be overlooked in solving problems

6. What is generally considered as the most serious change in the project plan?

   A. To modify slightly the work breakdown structure
   B. To revise the project budget
   C. To modify some project schedules
   D. To modify thoroughly the project goal or mission

7. What should be the final output of a staff meeting devoted to progress reporting?

   A. A priority listing of deviations
   B. A set of possible problem solutions
   C. A statement of decision objectives or goals
   D. Revision of the data base

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. ____In most cases a deviation occurs because of some unplanned change.

9. ____The final output of the problem identification step in a project is a priority listing of solutions.

10. ____Decision making from a project management point of view consists of identifying all the deviations first.

11. ____The project manager must develop a list of selected needs and likes which serves as standards against which to judge alternatives.

12. ____The project manager should visualize each alternative as optional and consider the effect it might have on the project.

13. ____The selection of a best alternative will likely be the result of trade-off's between the various advantages and disadvantages of selected prospective alternatives.

14. ____In specifying the ends, the project manager must delineate both results expected and the resources availabe for carrying out the corrective course of action.

Check your answers on the following page.

Lesson 10--Problem-Solving Through Management Action

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 10 pretest are listed down the right margin. The first column are for the first page, the second column is for the second page of the pretest. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the problem-solving process and should read the lesson abstract and content outline beginning on page 10.6. Then begin the tape-slide presentation by turning to the instructions on page 10.8.

If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the problem-solving process, and should read the lesson abstract and content outline on page 10.6. Then, if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 10.20. If you do desire to view the tape-slide presentation, turn to the instructions on page 10.8.

Multiple Choice

1. C
2. C
3. D
4. C
5. A
6. D
7. B

True/False

8. T
9. T
10. F
11. T
12. T
13. T
14. T

Lesson 10--Problem-Solving Through Management Action

Lesson Abstract and Content Outline

ABSTRACT

The solution of a problem which occurs during the operation of a project involves the determination of the cause of the problem, the generation of alternative solutions, and the selection of a "best" solution. The selection of a "best" solution is facilitated by the analysis of each alternative on the basis of the project manager's objectives in making his choice of solution. The analysis of each alternative involves a go/no go evaluation against each "need" and the assignment of a weight for each "like."

CONTENT OUTLINE

A. The identification and solution of problems in the operation of a project is a fundamental action in project control. Management action is needed on three points.

   1. To determine a likely cause for the problem,

   2. To develop ideas useful in analyzing the cause,

   3. To determine what corrective or adaptive action would be most appropriate.

B. Problem-solution centers upon a decision concerning alternative means to alleviate the problem (deviation).

   1. The desired outcomes or ends are to be specified.

      a. The end results and required resources are listed.

      b. The ends are ranked in terms of "needs" and "likes" where needs are absolute requirements and likes are desirable requirements in the outcomes.

      c. The likes are ranked and given weights.

   2. Buying a car is a situation which permits the use of a needs-likes analysis.

C. Alternative solutions for resolving the problem are developed by:

1. determining time, cost, performance trade-offs,

2. altering goal or plan to fit the actual conditions.

D. The alternative which offers the highest likelihood of solving the problem is selected on the basis of:

1. a go/no go evaluation for each "need,"

2. the weight on each "like,"

3. the multiple of weights and "satisfying score" for each like within an alternative,

4. the sum of the multiples for each alternative,

5. the set of consequences surrounding each alternative including probabilities and threats.

Turn to the presentation instructions on the following page or if going directly to the lesson exercises, turn to page 10.20.

Lesson 10--Problem-Solving Through Management Action

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the slide marked Module 2--Basic Principles and Techniques of Project Management, Lesson 10--Problem-Solving Through Management Action.*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 10--Problem Solving Through Management Action

Lesson Text

Introduction

In the previous lesson the monitoring of project progress and problem identification was described. The output of this process is a priority listing of current deviations or problems. This lesson is concerned with the next step--problem solving.

Determining Problem Cause

After having identified a deviation, the project director must fully investigate all aspects of the problem in order to determine why it has occurred. In most cases a deviation occurs because of some unplanned or unanticipated change. Some examples of unplanned or unanticipated changes are staff illness, staff conflict, late arrival of materials and supplies, arrival of materials and supplies of the wrong type, or inability of the staff to perform at the expected level.

If the project manager cannot readily identify the situation that caused the deviation, several alternative ideas or hypotheses regarding what change may have occurred can be developed. These ideas should be developed into precise statements to be tested later to determine the likely unplanned change causing the problem.

Once the project manager has generated a seemingly complete list of statements of probably problem causes, he should test each statement to determine the true cause of the problem. In testing the statements, the project manager tries to eliminate or discredit each statement by asking if the stated unplanned situation could result in the reported deviation. That is, would it cause what is observed, and nothing more?

By this process of elimination, the project manager is able to determine the cause of the deviation or problem.

Problem Solution

After determining the cause of a problem, the project manager must develop a solution to the problem. One alternative is to eliminate, if possible, the cause. If he cannot eliminate the cause, he must then try to minimize the effect of the cause by taking some type of adaptive action which reduces the significance of the immediated deviation, or problem, and possible future deviations. In either case, the project director must make a decision on the appropriate course of action to correct the deviation. Decision-making consists of specifying the result that must be achieved, developing alternative courses of action to achieve that result, and selecting the most desirable alternative by using criteria of advantages and disadvantages.

Specifying Results: The project manager and staff must first specify the results or ends they want to achieve. For example, to keep the project on schedule, etc. In specifying the ends, the project manager must delineate both the results expected and the resources available for carrying out the corrective course of action. Consider the example of a project being off its time schedule due to insufficient staffing. In this case, the expected results might be that the project manager must acquire an additional staff member to stay on schedule, but within a maximum weekly salary of $200.

Once the project manager has determined generally what he wants to accomplish, he should try to specify it in more detail. The more specific he can be, the easier it will be to develop alternative courses of action to satisfy the ends. In order to achieve specificity, the project director can ask: What are the absolute minimum requirements? (What are my real "needs"?), and What features do I want to include? (What are my "likes"?).

A "need" represents an absolute necessity which cannot be violated. For example, suppose a project proposal must be submitted by a certain date, so that a school district can receive funds. The "need" is to have a proposal by a certain date. Suppose that during the preparation of the proposal, new information is obtained which, if included in the proposal, might insure the grant but delay the proposal beyond the set date. Such information could not be included in the proposal because it would violate the concept of satisfying a "need". A "like" is something not absolutely necessary, but quite desirable. For the project proposal example, the "likes" might be to have the proposal bound with appropriate covers, consist of approximately 50 pages, offset printed, and edited by a professional. Since some likes are more desirable than others, they should be ranked according to their desirability. The ranking can either be done simply by listing the "likes" in their order or desirability or by assigning relative weights to each.

To illustrate the process of specifying an end result, consider the example of a man who needs a second car, or other means of transportation for his wife, so that they can both get to their respective places of employment. He determines the "needs" to be--

- o it must be a car, not anything like a pick-up truck or motor cycle,
- o it must have an automatic transmission,
- o it must not be more than three years old in order to minimize repair expenses,
- o it must cost less than $2000, due to budget constraints,
- o it must yield at least 15 miles per gallon of gasoline,
- o his wife must like the car.

He determines the "likes" to be--

- o have a blue finish, clean interior, power brakes, air conditioning, radio and good tires,
- o start easily,
- o run smoothly,
- o accelerate fairly rapidly,
- o brake well.

Also, if it is bought from a dealer, the dealer should--

- o offer a guarantee,
- o give a "good" deal,
- o have a good service reputation.

After listing the likes, he must rank them by reordering the list or by assigning relative weights to each. He then gathers information by looking at alternative cars that fit the list, being careful to see that the cars do not violate any of the "needs" and still score high in satisfying the various "likes". The project manager must also develop a list of "needs" and "likes" which serves as a standard against which to judge alternatives. This list will reflect his value system and that of his staff.

Developing Alternatives. - After the desired ends have been specified for a problem situation, alternative courses of action must be developed. There are usually a number of alternative courses of action that will solve a particular problem, but sometimes there is only one. The project director should develop as many alternatives as possible. Most of the alternatives will deal with trade-offs. In making these trade-offs, care should be taken not to drastically affect the overall project plan, especially with regard to performance standards.

In developing the alternative courses of action, the project director should consult the project personnel that are most familiar with the problem.

Because of their intimate knowledge of the problem, they can give valuable advice. Sometimes, however, the personnel most familiar with the problem have difficulty thinking of new or different approaches. Consequently, it may be advantageous to use experts or outside consultants in the problem area to help generate alternatives.

Selecting an Alternative. - After a number of possible alternative solutions to the problem have been generated, the project manager compares each alternative with his list of "needs" on a go/no-go basis. Any alternative which does not satisfy all of the "needs" is deemed unfeasible and is, consequently, rejected. The project manager now has a smaller set of feasible alternatives.

Next, he compares each of these feasible alternatives with his list of ranked or weighted "likes". Each alternative is judged against each of the "likes". If the project director chooses, each alternative can be assigned a number to show how well it satisfies or fits each of the "likes". This can be done by assigning a value of satisfaction on a scale running from 1 to 10, as was done for the weighting each of the list of "likes". Next, the weight of each "like" is multiplied by the value of satisfaction for each alternative. The results of these multiplications are then added to obtain an overall score for each alternative. The alternative with the highest score is deemed and the most desirable, or "best", alternative. This process of judging alternatives against each of the "likes" is illustrated in Table #1.

In selecting an alternative, the project director does not necessarily have to use this method. He can choose to judge intuitively the overall rank of each alternative in fitting all the likes. He could also simply count

	Weight or Importance	Alternative A		Alternative B		Alternative C	
		Satisfaction Value	Subtotal (Weight X Value)	Scale Value	Subtotal (Weight X Scale Value)	Scale Value	Subtotal (Rank times Scale Value)
LIKE 1	1	2	2	6	6	7	7
LIKE 2	3	7	21	2	6	3	9
LIKE 3	2	5	10	4	8	6	12
TOTAL	▨	▨	33	▨	20	▨	28

Table #1--Sample Table for Judging Alternatives the number of likes satisfied by each alternative and select the one that satisfies the most likes.

Even though one alternative course of action may satisfy all of the "needs" and have the highest score on the "likes", the result of selecting that particular course of action may yield undesirable consequences. The project manager should visualize each alternative as operational and consider any possible effect it might have on the project, and the effect that other events might have on the alternative. The project manager is well advised to ask his staff and others for help with this difficult task. The undesirable consequences of the two or three alternatives with the highest scores or rankings should certainly be considered before a final selection is made. Alternatives with highly undesirable consequences should be rejected.

Some alternatives, although satisfying fewer "likes", do not threaten to result in undesirable consequences. The project manager is advised in such cases to estimate the probability of undesirable consequences resulting from the selection of somewhat less highly-ranked, or valued, alternatives.

The selection of a "best" alternative will probably be the result of trade-offs among the various advantages and disadvantages of several prospective alternatives.

An example from a real project may help to illustrate this problem-solving, decision-making process of project control. A periodic progress report described a situation in which it was estimated that 25 weeks were needed to complete the project end product (a published monograph) and that only 14 weeks remained before the monograph was due to be completed. Thus, the project will have an 11-week overrun. The cause was determined to be the large amount of artwork to be done. The staff then met to consider other alternatives. One possible alternative was to ask for a time extension. The next two were concerned with cutting down the time to be spent on artwork by simplifying it or by reducing it. Since finishing as scheduled within the budget was a "need", the first possible alternative was rejected from final consideration. After considering the advantages and disadvantages and possible undesirable consequences of these other two alternatives, the project manager decided to both simplify and reduce the amount of the artwork but not to eliminate all of it. He traded off what might be called the performance dimension of the project, in order to maintain the time schedule and stay within the budget figure.

Summary

Resolving deviations or problem-solving is the second step in the operations phase. This step involves determining the cause of a problem or deviation, specifying desired results or ends relative to the problem situation, developing alternative courses of action to resolve the problem, and selecting a "best" alternative by comparing the various alternatives against the specified ends. The next lesson is concerned with the third step in the operations phase -- decision implementation.

Turn to page 10.20 and read the directions for Exercises A, B, C and D.

Lesson 10--Problem-Solving Through Management Action

Setting for Exercises A, B, C, and D

BACKGROUND:

Metropolitan School District is conducting a curriculum project under contract with the National Science Foundation (N.S.F.). The project goal is to produce short science lessons geared to the local area. Climate, terrain and ecology are particular to certain geographical regions of the United States. The study of science in these regions can be facilitated if lessons are built to utilize the natural surroundings.

Geology, ecology, zoology, botony and other science areas which have specific application to the local area are to be utilized in lesson development. The lessons are to be designed for fifth and sixth grade students.

The project runs for a full year and is divided into six time periods. Lesson materials are to be sent to N.S.F. every eight weeks as they are developed. The project should produce 30 lessons--five lessons for each eight-week period.

The contract is such that the Metropolitan School District receives money each time five are received and accepted. The school system is not providing any additional funds, but is providing all facilities and start-up equipment. Special services are provided at a reduced price. The project is responsible for personnel, new equipment, and materials.

The project thus far has produced five lessons (A, B, C, D, and E) and is operating in the second time or work period. To simplify the problem, assume that you are only concerned with the second work period of the project. Personnel includes the project director and five lesson developers. Data from the first period indicates the work rate for the staff is that one person working full time can produce one lesson in eight weeks. This work rate also applies when several people work on the same lesson, i.e., two people can complete one lesson in four weeks. Assume that each staff member has a working knowledge in all of the science areas.

PROBLEM:

As project manager, you receive the project status report shown on the next page. After studying the report, you identify the deviations and list them in order. The deviation that appears at the top of the list is that lessons I and J are behind schedule. These two lessons are the ones that are only one-half finished and should be three-fourths finished by the date of the report.

Project Status Report

Date: End of fifth week of second period

Package	SCHEDULE		PACKAGE PERFORMANCE[xxx]			
	Actual Status	Planned Status	Checked		Plan Met	
			Yes	No	Yes	No
Lesson F	Complete	3/4 complete	x		x	
Lesson G	Complete	3/4 complete	x		x	
Lesson H	3/4 complete	3/4 complete	x		x	
Lesson I	1/2 complete	3/4 complete	x		x	
Lesson J	1/2 complete	3/4 complete	x		x	
Lesson K	Just started	Third work period				
Lesson L	Just started	Third work period				

Budget and Expenditures

Item	ACTUAL	BUDGETED		
	6 weeks	Total 6 weeks	Permissable Limits	Total 8 weeks
Project Director	$1,800	$1,800	± $180	$2,400
Personnel (5 people)	7,500	9,000	± 900	12,000
Materials	700	750	± 75	1,000
Equipment	450	375	± 38	500
Special Services	300	300	± 30	400
TOTAL	$10,700	$12,225	$13,448	$16,300

[xxx] Local performance specifications for the lessons are higher than National Science Foundation requirements. Performance is evaluated by a reaction team which reviews the lessons during four stages of the development process. An X in the "checked" column indicates that the lesson has been checked and an X in the "Plan Met" column indicates the lesson has met the planned specifications.

Lesson 10--Problem-Solving Through Management Action

Exercise A

Directions: Using the information contained in the background, problem, and report, complete the items below.

1. Propose a least four possible reasons which might explain the deviation.

   a. ______________________________
   b. ______________________________
   c. ______________________________
   d. ______________________________
   e. ______________________________
   f. ______________________________

2. Describe how you might test or check each of your proposed possible reasons to determine if it would explain the cause of the deviation.

   a. ______________________________
   b. ______________________________
   c. ______________________________
   d. ______________________________
   e. ______________________________
   f. ______________________________

Turn the page and check your answers against suggested answers. Considerable latitude should be permitted as your answer need only capture the essence of the idea. Then proceed with exercise B.

Lesson 10--Problem-Solving Through Management Action

Exercise A--Solution

1. Propose a least four possible reasons which might explain the deviation.

   Your answer might include some of the following possible reasons for the cause of the deviation.

   a. Staff has been sick.
   b. Staff are working on too many lessons at once.
   c. Materials for lessons have not arrived.
   d. Weather conditions have not been favorable for outdoor work.
   e. On-the-job work rate for the staff has been reduced.

2. Describe how you might test or check each of your proposed possible reasons to determine if it would explain the cause of the deviation.

   a. Determine that no staff has been sick.
   b. Establish that the staff has been working on too many lessons at the same time.
   c. Check receipt of materials.
   d. Determine that weather conditions were acceptable for outdoor work.
   e. Check present work rate of the staff.

Lesson 10--Problem-Solving Through Management Action

Exercise B

You have investigated the proposed reasons and find that the cause of the problem is that the five people on the staff are working on too many lessons at once. You must correct the deviation. Identify and list the desired ends in correcting the problem. Remember you must consider two aspects in developing your ends, the results you expect and the resources you will utilize. I desire that:

Turn the page and check your answers against suggested answers. Considerable latitude should be permitted as your answer need only capture the essence of the idea. Then proceed with exercise C.

Lesson 10--Problem-Solving Through Management Action

Exercise B--Solution

You have investigated the proposed reasons and find that the cause of the problem is that the five people on the staff are working on too many lessons at once. You must correct the deviation. Identify and list the desired ends in correcting the problem. Remember you must consider two aspects in developing your ends, the results you expect and the resources you will utilize. I desire that:

Your answer might be:

a. Five lessons must be completed on time.
b. The budget should not be overspent.
c. Project director continues at the same rate in development of lessons.
d. Work on more than five lessons at once.

Lesson 10--Problem-Solving Through Management Action

Exercise C

1. You have determined the given list of ends appearing in the table for solving the deviation. Identify them in terms of the "needs" and "likes" with checks. Then for each of the "likes" assign weight using a scale of one to ten for little to very important. Remember that "needs" are absolutely necessary ends and "likes" are desirable ends that are not absolutely necessary.

ENDS	"Needs"	"Likes"	"Likes" Weight
A. Five lessons must be completed on time.			
B. The budget should not be overspent.			
C. Project director continues at the same rate on lesson development.			
D. Work on more than five lessons at once.			

2. Utilize this "needs/likes" list and create several alternative courses of action to alleviate the deviation.

a. ______________________

b. ______________________

c. ______________________

d. ______________________

____

Turn the page and compare your answers.

Lesson 10--Problem-Solving Through Management Action

Exercise C--Solution

1. You have determined the given list of ends appearing in the table for solving the deviation. Identify them in terms of the "needs" and "likes" with checks. Then for each of the "likes" assign weight using a scale of one to ten for little to very important. Remember that "needs" are absolutely necessary ends and "likes" are desirable ends that are not absolutely necessary.

ENDS	"Needs"	"Likes"	"Likes" Weight
A. Five lessons must be completed on time.	X		
B. The budget should not be overspent.		X	8
C. Project director continues at the same rate on lesson development.		X	5
D. Work on more than five lessons at once.		X	4

2. Utilize this "needs/likes? list and create several alternative courses of action to alleviate the deviation.

Alternative courses of action might be the following:

a. *Direct all personnel to finish lesson I, J, and H.*

b. *Hire two new people to help with the lessons.*

c. *Help more with development work yourself (project director).*

d. *Terminate the project when the money runs out.*

Lesson 10--Problem-Solving Through Management Action

Exercise D

After considering a number of alternatives, you have established the following list of alternatives to alleviate the deviation for serious consideration.

a. Direct all personnel to finish lessons H, I, and J.
b. Hire two new people to help with lessons I and J.
c. Project director increases his participation in lesson development and directs some of the staff to finish lessons H, I, and J.
d. Terminate the project when the money runs out.

You are to determine which of the alternatives to select for implementation. The selection is accomplished by determining how well the alternatives satisfy the "Need/Likes" list of ends. Each alternative must be judged against each "need" and each "like."

The table on the next page will aid you in this process. The table is set up so that the "needs/likes" are in horizontal rows. The alternatives are vertical columns. In this way the intersection of the rows and columns will provide a space to indicate how well the particular "need/like" is satisfied by the particular alternative. Judging the alternatives is done in two steps: first for the "needs" and second for the "likes."

Judging "needs"

Since a "need" is an absolutely necessary end, you must first determine if each "need" is completely satisfied by each alternative. If the alternative satisfies the "need" then indicate this by placing the word "go" in the intersection space. If it does not satisfy the "need" completely, place a "no go" in the box. An alternative receiving a "no go" in any box is not to be considered in the "likes" judgement process. You have rejected it.

Judging "likes"

Since "likes" are just desirable ends, you must determine how well each alternative satisfies each "like." Forget for the moment how desirable each "like" is. Judge only on how well the alternative satisfies the "need" by assigning a satisfying score (ss). The satisfying score is simply a weight or number between zero and ten indicating how well you think the alternative satisfies the "like." A zero would indicate that the alternative does not satisfy the "like at all and a ten would indicate that it satisfies the "like" completely.

After you have assigned a satisfying score for each box you are to multiply two numbers. Multiply the desirability weight (weight (w) on the table) with the satisfying score (ss) and place your result in the multiple column (mult. on the table).

w x ss = Mult.

Do this for each box. Then add the multiple columns for each of the alternatives. The alternative receiving the highest score is the most desirable. The alternative satisfies the most desirable "likes" best.

Lesson 10--Problem-Solving Through Management Action

Exercise D

Alternative 1. Direct all personnel to finish lessons I, J, and H.
Alternative 2. Hire two new people to help with lessons H through L (cost: $1000).
Alternative 3. Project director and all staff work on developing lessons I, J, and H.
Alternative 4. Terminate the project when the money runs out.

Needs/Likes List / Alternatives		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
NEEDS		go or no/go		go or no/go		go or no/go		go or no/go	
Need 1. Five lessons must be completed on time.									
Need 2.									
LIKES	Weight (w)	Satisfying score ss1	Mult. w x ss1	Satisfying score ss2	Mult. w x ss2	Satisfying score ss3	Mult. w x ss3	Satisfying score ss4	Mult. w x ss4
Like 1. The budget should not be overspent.	8								
Like 2. Project director continues at the same rate on lesson development.	5								
Like 3. Work on more than five lessons at once.	4								
Like 4.									
TOTAL SCORE									

1. What is the most desirable alternative? ______________________

____

2. Determine the consequences of the two best alternatives, list them, and determine the probability that they may occur.

____

____

____

3. Would they affect your final choice? Yes ____ No ____

Turn the page and check your work.

Lesson 10--Problem-Solving Through Management Action

Exercise D--Solution

Alternative 1. Direct all personnel to finish lessons I, J, and H.
Alternative 2. Hire two new people to help with lessons H through L (cost: $1000).
Alternative 3. Project director and all staff work on developing lessons I, J, and H.
Alternative 4. Terminate the project when the money runs out.

Alternatives / Needs/Likes List		Alternative 1		Alternative 2		Alternative 3		Alternative 4	
NEEDS		go or no/go		go or no/go		go or no/go		go or no/go	
Need 1. Five lessons must be completed on time.		go		go		go		no/go	
Need 2.									
LIKES	Weight (w)	Satisfying score ss1	Mult. w x ss1	Satisfying score ss2	Mult. w x ss2	Satisfying score ss3	Mult. w x ss3	Satisfying score ss4	Mult. w x ss4
Like 1. The budget should not be overspent.	8	10	80	3	24	7	56	X	
Like 2. Project director continues at the same rate on lesson development.	5	10	50	10	50	0	0	X	
Like 3. Work on more than five lessons at once.	4	0	0	10	40	10	40	X	
Like 4.									
TOTAL SCORE			130		113		96		

1. What is the most desirable alternative? *Alternative 1 in this case has the highest total.*

2. Determine the consequences of the two best alternatives, list them, and determine the probability that they may occur.

   For Alternative 1 your answer might be: Staff may not want to be transferred to lessons I and J. Low probability.

   For Alternative 2: May not get staff on time. High probability.

3. Would they affect your final choice? Yes ___ No _X_

Lesson 10--Problem-Solving Through Management Action

Directions and Choices Following the Practice Exercises

Based upon the self-evaluation of your performance on the exercise you have either:

A. *acceptably satisfied the objective of solving a project problem and should now turn to the post-test found on page 10.34.*

An additional example on dealing with operational project problems is found beginning on page 10.37. References for additional reading are listed on page 10.39.

B. *not satisfied the objective, and should select one or more of the following courses of action.*

1. *If your exercise D chart was correct except for the number calculations, then either:*
    - a. *Study the additional example beginning on page 10.37 and then rework exercise D on page 10.28.*
    - b. *Read Chapter Ten of Educational Project Management by Desmond L. Cook and then rework exercise D on page 10.28.*
    - c. *Rework exercise D on page 10.28.*
2. *If your exercise D chart was not correct in most of the aspects, then either:*
    - a. *View the slide-tape presentation; instructions are on page 10.8. After the presentation, rework exercise D on page 10.28.*
    - b. *Read the lesson narrative beginning on page 10.9. After the presentation, rework exercise D on page 10.28.*

Lesson 10--Problem Solving Through Management Action

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ___________.

1. Whom should the project manager primarily involve in developing potential alternative courses of action?

   A. All project staff
   B. Contracting agency program officer
   C. Departmental Supervisors
   D. Project personnel familiar with the problem

2. What is the initial standard against which possible solution alternatives are judged?

   A. Project plan
   B. Statement of needs
   C. Statement of likes
   D. Staff acceptability

3. Should there be any restrictions on how many alternatives a project manager and his staff can develop initially in solving an operational problem? Why?

   A. Yes, because one alternative removes confusion
   B. Yes, since only two or three alternatives are likely to be useful or practical
   C. No, because projects require many alternatives
   D. No, since potential alternatives could be overlooked

4. From the project management point view, what is the first activity in decision-making?

   A. Specifying the results or ends that are to be achieved
   B. Specifying the means for solving problems
   C. Specifying the causes of the problems
   D. Developing the competencies of project staff

5. What should be the final output of a staff meeting devoted to progress reporting?

   A. A priority listing of deviations
   B. A set of possible problem solutions
   C. A statement of decision objectives or goals
   D. Revision of the data base

6. Will any time, cost and performance trade-off's occur in the development of alternative solutions?

   A. Yes, all three will be involved
   B. No, they are only of concern in the project planning phase
   C. No, they are only of concern in the project preparation phase
   D. No, they can be overlooked in solving problems

7. What is generally considered as the most serious change in the project plan?

   A. To modify slightly the work breakdown structure
   B. To revise the project budget
   C. To modify some project schedules
   D. To modify thoroughly the project goal or mission

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. _____ The final output of the problem identification step in a project is a priority listing of solutions.

9. _____ Decision making from a project management point of view consists of identifying all the deviations first

10. _____ In most cases a deviation occurs because of some unplanned change.

11. _____ In specifying the ends, the project manager must delineate both the results expected and the resources available for carrying out the corrective course of action.

12. _____ The selection of a best alternative will likely be the result of trade-off's between the various advantages and disadvantages of selected prospective alternatives.

13. _____ The project manager should visualize each alternative as optional and consider the effect it might have on the project.

14. _____ The project manager must develop a list of selected needs and likes which serves as standards against which to judge alternatives.

Check your answers on the following page.

Lesson 10--Problem-Solving Through Management Action

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to lesson 10 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the project problem-solving process and should select one or more of the following courses of action.

1. *View the slide-tape presentation by turning to page 10.8 and proceeding After the presentation, turn to the Lesson Quality Control Form on page 10.40.*
2. *Read the lesson narrative beginning on page 10. 9. Then turn to the Lesson Quality Control Form on page 10.40.*
3. *Read Chapter Ten (pages 174-181) of Educational Project Management by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 10.40.*
4. *Study the additional example beginning on page 10.37 and then turn to the Lesson Quality Control Form on page 10.40.*
5. *Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 10.40.*

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the project problem-solving process and should now turn to the Lesson Quality Control Form on page 10.40. An additional example on solving control problems is found on page 10.37. References for additional reading are listed on page 10. 39.

Multiple Choice

1. D
2. A
3. C
4. A
5. B
6. A
7. D

True/False

8. T
9. F
10. T
11. T
12. T
13. T
14. T

Lesson 10--Problem-Solving Through Management Action

Additional Example

The following memorandum was used in the problem-solving activity of a project. It presents the identification, analysis and solution of a problem.

Memo to: J. J. Rutledge, Program Specialist, Instructional Development Project.

From: P. P. Gross, Project Manager

Date: March 8

I. By this date, the project was to have 180 color illustrations drawn and photographed. I note that only 120 have been finished. Since the instructional tryout is scheduled for March 17, and this date is firm, then we need to make a decision regarding the 60 illustrations which are not finished. The artist has been producing an average of six illustrations a day.

NEEDS

1. By March 17, need the 60 slides.
2. By March 15, need 60 illustrations.
3. By March 15, need the illustrations photographed.
4. Produce slides without exceeding the $200 contingency fund amount.

LIKES	WEIGHT
A. All 60 illustrations showing consistent artistic work with the other 120.	8
B. All 60 illustrations in color.	6
C. All 60 illustrations will score a value of eight out of ten from the review panel.	7
D. Not exceed $40 extra production costs.	5

II. Alternatives

1. Have artist get as many illustrations done during the remaining five working days as possible. Projection: 30 illustrations will not get done. Need 60, therefore No go.

2. Have artist work double shifts and/or additional days (will cost $200) which will probably reduce value-quality.

Needs 1, 2, 3, 4 Go

Likes	Rank	Satisfying Score	Multiple	
A	4	10	40	
B	2	10	20	
C	3	0	0	
D	1	0	0	Total 60

3. Hire another artist to assist in drawing the illustrations. Due to the need for orientation to materials, both artists' production reduced and estimated at five illustrations each per day for five working days (cost: $200).
Projection: 2 X 5 x 5 = 50 illustrations done: No go.

4. Have artist draw high quality illustrations, but draw black and white illustrations which permits production time to be doubled and all 60 drawings to be finished.
Needs 1, 2, 3, 4, Go

Likes	Rank	Satisfying Score	Multiple	
A	4	10	40	
B	2	0	0	
C	3	5	15	
D	1	10	10	Total 65

III. Decision

Alternative four does not violate any of the Needs and it scores 20 on the Wants.

IV. Consequences

1. The lack of color will reduce the quality of illustrations for the tryouts.
2. When time permits the illustrations can be colored and rephotographed at nominal cost.
3. The black and white illustrations will be somewhat scattered through the presentations and may present a variety to the color illustrations.

V. Insure that H. Roper, the artist, is informed of this decision.

Lesson 10--Problem-Solving Through Management Action

Reading References

Additional knowledge about problem-solving within project operational control can be obtained by reading from the references cited below.

Archibald, R. D. and R. L. Villoria. Network-Based Management Systems. New York: John Wiley and Sons, Inc., 1967, Chapter 16.

Baumgartner, John S. Project Management. Homewood, Ill.: Richard D. Irwin, INc., 1963, Chapters 3 and 4.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 10.

Woodgate, H. S. Planning by Network. London, England: Business Publications, Ltd., 1964, pp. 323-325.

Lesson 10--Problem Solving Through Management Action

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated ________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

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Turn the page and proceed

Lesson 10--Problem-Solving Through Management Action

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on problem-solving through management action is now completed. Lesson 11 entitled "Implementing Changes in Project Operations" is the next lesson in the sequence. You are advised to locate the lesson booklet and read the introductory page.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 11 -- Implementing Changes in Project Operations

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 11--Implementing Changes in Project Operations

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet containing the following items

Introduction to Lesson. 11.1
Overview and objectives 11.2
Pretest 11.3
Lesson abstract and content outline 11.5
Lesson text 11.8
Exercises on solution or decision implementation. 11.13
Post-test 11.18
Additional examples 11.20
Reading references. 11.25
Lesson Quality Control Form 11.26

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 11--Implementing Changes in Project Operations."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 11--Implementing Changes in Project Operations."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 8 minutes, the exercises take approximately 30 minutes. About 70 minutes is needed to complete the entire lesson.

Lesson 11--Implementing Changes in Project Operations

Overview and Objectives

OVERVIEW

In the previous lesson, the methodology of problem-solving was discussed. Problem-solving was presented with respect to the steps of determining causes, specifying ends, developing alternatives, and selecting the best alternative.

This lesson is concerned with the implementation of the selected solution. Emphasis is given to developing the implementation plan and the need for informing management of changes made.

OBJECTIVES

The student in completing this lesson should be able to create a plan for implementing a given decision. The specific objectives are as follows:

1. The student will devise an implementation plan for a given decision.

2. Identify actions needed to insure successful implementation of a given solution.

3. Identify information that should be provided to management about implementing a given decision-performance evaluation: the student's answers are to be judged as satisfactory by self-checking the answers against the suggested answers provided.

Complete the pretest on the following page.

Lesson 11--Implementing Changes in Project Operations

Pretest

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________________.

1. What are the three basic steps in the control process?

   A. Preparing schedules, listing costs, and decision-making
   B. Deviation identification, decision making, and decision implementation
   C. Creating a plan, preparing directions, and implementing the decisions
   D. Listing costs, preparing directions, and decision-making

2. What major tasks comprise decision implementation in the operational control phase?

   A. Creating a plan and estimating time
   B. Making changes in the project and implement them
   C. Informing top management and selected project staff of changes in the project
   D. Creating a plan, informing the project staff and top management about resultant changes and carrying out the action

3. The creation of a solution or decision implementation plan is basically what general type of management function?

   A. Controlling
   B. Planning
   C. Organizaing
   D. Directing

4. What is the major function or purpose of a change memorandum of an implementation plan?

   A. To specify in detail the corrective actions to be taken
   B. To develop a plan for preparing alternatives
   C. To provide more responsibilities for the staff
   D. To prepare a follow-up plan

5. Why is the process of control considered to be cyclical in nature?

   A. Most deviations in the project are complex in nature and frequently re-occur
   B. Each decision must be reviewed by project staff
   C. The consequences of each new decision need to be reviewed as the project proceeds towards its goal
   D. A decision needs to be reviewed only in the beginning

6. Why is a plan needed for the implementation of a problem solution?

   A. To provide more responsibilities for the project staff
   B. To satisfy the funding agency
   C. To help insure that the corrective action will be carried out properly
   D. To establish better controls in a project

7. What relationship exists between the planning and the operational control phase in the overall project management context?

   A. Control is independent of planning
   B. Planning follows project control decisions
   C. Planning assists control to a limited extent
   D. Planning is the basis for effective control

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. _____Changes in the work breakdown structure and performance standards of the project should be reflected in a revised work breakdown structure.

9. _____Any changes to the task sequence of the project should be identified and incorporated into a revised work flow.

10. _____The change memorandum should include actions taken for all the project problems.

11. _____The information contained in the change memorandum must be communicated to the project staff.

12. _____A report to top management from the project manager should contain the selected course of action but not the reasons for selection

13. _____The project manager must verify particularly that the responsibilities designated in the memorandum are understood by project senior staff.

14. _____The three steps of the process of control are repeated throughout the life cycle of a project.

Turn the page and check your answers.

Lesson 11--Implementing Changes in Project Operations

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 11 pretest are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the solution or decision implementation process and should read the lesson abstract and content outline beginning on page 11.5. Then begin the tape-slide presentation by turning to the instructions on page 11.7.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the solution or decision implementation process and should read the lesson abstract and content outline beginning on page 11.5. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercises beginning on page 11.13. If you do desire to view the tape-slide presentation, turn to the instructions on page 11.7.

Multiple Choice

1. B
2. D
3. B
4. A
5. C
6. C
7. D

True/False

8. T
9. T
10. F
11. T
12. F
13. F
14. T

Lesson 11--Implementing Changes in Project Operations

Lesson Abstract and Content Outline

ABSTRACT

After selecting action to be taken to solve a problem, it is necessary to implement it. Such action must plan for consequences, and include controls, reporting procedures, and detailed staff instructions. Information must be provided to management about the changes made. The decision must be monitored to be sure it is working smoothly.

CONTENT OUTLINE

A. Control of a project is a three step process which includes:
   1. Identifying the problem,
   2. Selecting the solution from several alternatives, and
   3. Implementing the chosen solution.

B. An implementation plan is needed for the action and the changes in a project.

C. The project director should use planning thinking in developing the implementation plan or change memorandum.
   1. Goals or tasks may be changed.
   2. The work breakdown structure and performance standards for the project may be revised.
   3. Changes in the work sequence may require a revised work flow.
   4. Project times may have to be re-estimated.
   5. A revised schedule may incorporate changes in time and dates.
   6. There may be changes in the project budget.
   7. There may be changes in the project information system.
   8. Staff member responsibilities should be clearly defined.
   9. All potential problems resulting from the change must be identified.

D. The project staff must be informed of the actions and the changes.

E. Top management must be informed of the project progress problems and solutions.

F. The project manager must follow through on action implementation.

  1. He must verify that responsibilities are understood.

  2. He must verify that directions are carried out.

  3. He must establish early warning devices to detect problems.

G. The steps of the operational control phase are reviewed.

Lesson 11--Implementing Changes in Project Operations

Instructions

1. Set up the recorder, projector, and screen.
2. Place the carousel slide tray for this lesson onto the projector and advance the tray to the start of "Basic Principles and Techniques of Project Management--Lesson 11, Implementing Changes in Project Operations."
3. Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.
4. Start the recorder and advance the slides with the "change tone."

Lesson 11--Implementing Changes in Project Operations

Lesson Text

Introduction

The basic step in the project operations process was the identification of deviations between the plan and the actual situation (by using a reporting system) and the determination of the impact of any deviations on the progress of the project. The second step was to determine the cause of each deviation and to develop a course of action designed to correct it. Usually several alternative courses of action are considered before the most desirable one is selected for implementation. The third step, making changes in operations, is the concern of this lesson. The tasks performed in this step are: creating a plan for implementing the selected course of action or change, informing the project staff and top-level management of the action and resultant changes in the project, and carrying out the action.

Implementation Plan

Once a best alternative course of action, or problem solution, is selected, the project manager must implement the action specified. In order to carry out this decision, an implementation plan or change memorandum should be prepared, specifying in detail the corrective action that is to take place. Since the creation of an implementation plan is basically a planning activity, the project manager is well advised to follow the same general thinking that he used in the project planning phase, regardless of whether the change is large or small. This insures that all aspects of the implementation are considered.

The implementation of a given problem solution can cause changes in future project operations and, if so, should be identified and detailed in a change memorandum. For example, if changes occur in the overall goal or in one of the major tasks of the project, such changes should be specified in a change memorandum and agreed upon by the funding agency. Changes in the work breakdown structure and performance standards of the project should be reflected in a revised work breakdown structure and set of performance standards for the project. Any changes in the task sequence of the project should be identified, and incorporated into a revised project work flow. Estimates of the time to complete each new task, and re-estimates of the time to complete any original tasks affected by the change, should be incorporated into the revised project work flow. A revised project schedule, including calendar dates for new tasks and revised dates for orginal tasks, should be generated. Changes in personnel and other resource items, as well as changes in the project budget and expenditure plan, should be determined and indicated in the change memorandum. Any changes to be made in the operation of the project information system and the project reporting system should be indicated. Also, any changes in information contained in the project information system should be specified.

After specifying the action and identifying the changes to the project, the project director should determine the responsibilities of each staff member in carrying out the proposed corrective action. He then must specify these responsibilities in detail and incorporate them into a change memorandum. In conjunction with these new responsibilities, the project director should detail or think through the direction and guidance he will give to his staff for carrying out their responsibilities effectively.

Once the project manager starts to implement the decision, adverse consequences considered earlier in the decision-making process become potential problems. Consequently, the following questions should be answered as the last step in developing the implementation plan or change memorandum: What are the potential problems in implementing this course of action? What are the possible causes of each problem? How can the potential problems be prevented or their effects minimized?

Ideally, the change memorandum should include the specification of any action to be taken in the event that each particular potential problem occur.

Staff Communication

The information contained in a change memorandum must be communicated to the project staff. The project manager should inform his staff of the action that is to take place and their responsibilities in carrying it out. A report to top management should contain a description of the deviation which exists, the cause of the deviation, the two or three alternative courses of action that have been generated to alleviate the deviation, the selected course of action, the reasons for the selection of that course of action, and the plan or change memorandum for implementing the selected course of action.

Change Execution

In the execution of the action described in the change memorandum, it is the project manager's responsibility to make sure that it is carried out fully and efficiently. He must verify that the responsibilites designated in the memorandum are understood by the project staff.

The project manager must also follow-up on the directions given to the staff to assure that they are followed. The project manager is well advised to establish a method through the project reporting system that will give him early warning if the execution of the action is running into difficulty.

The three steps of monitoring operations--to note deviations, decision-making and decision implementation--are repeated throughout the project. The process of operations monitoring is continuous, since the consequences of each new decision are always reviewed as the project proceeds toward its goal. Most deviations are elementary in nature and can be corrected easily. The project manager should be prepared, however, for situations that might create a great deal of anxiety for his staff and himself.

In summary, the operations phase consists of developing a reporting system to inform the project director of the status of the project at any give time by comparing the actual to the planned status; recognizing positive and negative deviations in terms of time, cost and performance; determining the cause of each deviation; creating several alternative courses of action to alleviate each deviation; selecting the most desirable course of action, using criteria based on advantages and disadvantages; implementing the course of action and making changes in the project; informing the staff and top management of the action and the changes, and the following through to see that the action is carried out.

Turn to page 11.13 and read the directions for Exercise A.

Lesson 11--Implementing Changes in Project Operations

Exercise A

Directions: This exercise continues the situation begun in the exercises in Lesson 10. With respect to the project problems from those exercises, you, as project manager, have selected the alternative course of action to shift the workers to finish the packages that are one-half finished.

1. Listed below are elements to be considered in writing your change memorandum to implement the action you have decided upon. Indicate briefly what changes, if any, you would make in each element.

   Changes in:

   a. Project goal ______________________

   b. Project work breakdown structure ______________________

   c. Project task-work sequence ______________________

   d. Project time estimation ______________________

   e. Project resources and schedule ______________________

   f. Project budget and expenditure plan ______________________

   g. Project information system ______________________

   h. Project information system information ______________________

   i. Project personnel responsibility ______________________

   j. Directions ______________________

   k. Potential problems ______________________

2. In this particular case what must you do during the execution of the change memorandum to insure success?

   ____

   ____

   ____

3. Indicate the elements you would include in a report to top management. Be specific for this problem which covers the following points:

   a. Deviation ____________________

   b. Cause of deviation ____________________

   c. Alternatives ____________________

   d. Selection ____________________

   e. Reasons ____________________

   f. Plan ____________________

Turn to the next page and check your answers.

Lesson 11--Implementing Changes in Project Operations

Exercise A--Solution

1. Listed below are elements to be considered in writing your change memorandum to implement the action you have decided upon. Indicate briefly what changes, if any, you would make in each element.

Changes in:

a. Project goal — None

b. Project work breakdown structure — None

c. Project task-work sequence — Shift personnel to Packages I and J.

d. Project time estimation — Additional personnel should finish packages on time.

e. Project resources and schedule — None

f. Project budget and expenditure plan. — None except for possible bonus for completing.

g. Project information system — None

h. Project information system information — Shift of personnel to packages I and J to complete them on time.

i. Project personnel responsibility — Person A and B to complete Package I
Person C and D to complete Package J

j. Directions — Talk to persons affected by the change.

k. Potential problems — Personnel not working well together. a) give encouragement for cooperation at start; b) give a bonus or move people around again if the problem occurs.

2. In this particular case what must you do during the execution of the change memorandum to insure success?

1. Communicate the contents of the change memorandum

2. Verify that responsibilities and directions were understood by persons A, B, C, and D.

3. Set up changes in the reporting system for more current feedback for early warning.

3. Indicate the elements you would include in a report to top management. Be specific for this problem which covers the following points:

a. Deviation	Packages I and J will not be finished on time if the situation persists.
b. Cause of deviation	Personnel working on too many packages at once.
c. Alternatives	Alt. 1--Shift personnel around to finish packages I and J. Alt. 2--Hire two new people to help with packages I and J.
d. Selection	Alternative 1
e. Reasons	All packages will be finished on time with no increase of expenditures except for possible bonuses.
f. Plan	A summary of the answer to question 1 of this lesson.

Lesson 11--Implementing Changes in Project Operations

Directions and Choices Following the Practice Exercise

Based on the self-evaluation of your performance on the exercise, you have either:

A. acceptably satisfied the objective of creating a change memorandum and supplying information to top management and should now turn to the post-test found on page 11.18 .

Additional examples of solution or decision implementation are found on pages 11.20 to 11.24 . References for additional reading are listed on page 11.25.

B. not satisfied the objective, and should select one or more of the following courses of action.

1. Study the additional examples beginning on page 11.20 and then rework exercise A on page 11.13
2. Read Chapter Ten of Educational Project Management by Desmond L. Cook and then rework exercise A on page 11.13.
3. View the slide-tape presentation; instructions are on page 11.7. After the presentation, rework exercise A on page 11.13.
4. Read the lesson narrative beginning on page 11.8, and then rework exercise A on page 11.13.
5. Rework exercise A on page 11.13.

Lesson 11--Implementing Changes in Project Operations

Post-Test

Directions: Please take time to carefully answer the multiple choice and the true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated______________.

1. What is the major function or purpose of a change memorandum of an implementation plan?

   A. To specify in detail the corrective actions to be taken
   B. To develop a plan for preparing alternatives
   C. To provide more responsibilities for the staff
   D. To prepare a follow-up plan

2. The creation of a solution or decision implementation plan is basically what general type of management function?

   A. Controlling
   B. Planning
   C. Organizing
   D. Directing

3. What major tasks comprise decision implementation in the operational control phase?

   A. Creating a plan and estimating time
   B. Making changes in the project and implement them
   C. Informing top management and selected project staff of changes in the project
   D. Creating a plan, informing the project staff and top management about resultant changes and carrying out the action

4. What are the three basic steps in the control process?

   A. Preparing schedules, listing costs, and decision-making
   B. Deviation identification, decision making and decision implementation
   C. Creating a plan, preparing directions, and implementing the decisions
   D. Listing costs, preparing directions and decision-making

5. Why is a plan needed for the implementation of a problem solution?

A. To provide more responsibilities for the project staff
B. To satisfy the funding agency
C. To help insure that the corrective action will be carried out properly
D. To establish better controls in a project

6. What relationship exists between the planning and the operational control phase in the overall project management context?

A. Control is independent of planning
B. Planning follows project control decisions
C. Planning assists control to a limited extent
D. Planning is the basis for effective control

7. Why is the process of control considered to be cyclical in nature?

A. Most deviations in the project are complex in nature and frequently re-occur
B. Each decision must be reviewed by project staff
C. The consequences of each new decision need to be reviewed as the project proceeds towards its goal
D. A decision needs to be reviewed only in the beginning

Indicate whether the statements listed below are true or false by writing a T or F on the line.

8. _____ The information contained in the change memorandum must be communicated to the project staff.

9. _____ The change memorandum should include actions taken for all the project problems.

10. _____ Any changes to the task sequence of the project should be identified and incorporated into a revised work flow.

11. _____ Changes in the work breakdown structure and performance standards of the project should be reflected in a revised work breakdown structure.

12. _____ The three steps of the process of control are repeated throughout the life cycle of a project.

13. ____A report to top management from the project manager should contain the selected course of action but not the reasons for selection.

14. ____The project manager must verify particularly the responsibilities designated in the memorandum are understood by project senior staff.

Turn the page and check your answers.

Lesson 11--Implementing Changes in Project Operations

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 11 post-test are listed down the right margin. Check your correct responses.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the solution or decision implementation process and should select one or more of the following courses of action.

1. *View the slide-tape presentation by turning to page 11.7 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 11.26.*
2. *Read the lesson narrative beginning on page 11.8, and then turn to the Lesson Quality Control Form on page 11.26.*
3. *Read Chapter 10 of Educational Project Management by Desmond L. Cook and then turn to the Lesson Quality Control Form on page 11.26.*
4. *Study the additional examples beginning on page 11.20 and then turn to the Lesson Quality Control Form on page 11.26.*
5. *Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 11.26.*

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the solution or decision implementation process and should now turn to the Lesson Quality Control Form on page 11.26. Additional examples on solution or decision implementation are found on pages 11.20 to 11.24 . References for additional reading are listed on page 11.25.

Multiple Choic

1. A
2. B
3. D
4. B
5. C
6. D
7. C

True/False

8. T
9. F
10. T
11. T
12. T
13. F
14. F

Lesson 11--Implementing Changes in Project Operations

Additional Example A

John Jones is the director of a project to produce instructional materials such as overhead projector transparencies and other art work for social studies instruction in the Midville School District. The project was designed to run for twelve weeks and had as its tasks (1) the identification of needs for such items among the school district's social studies teachers, (2) the production of such art work, and (3) the tryout of the art work produced to get teacher reaction so modifications could be made if any were needed.

The project has been plagued by a flu epidemic which hit the town during the first four weeks of the project. Of the five members of the project staff (the director, two writers, an artist, and a typist), three have been absent for periods ranging from one to two weeks with the flu. As a result of the delays which this caused, the projector now finds himself in the seventh week of the project, some two weeks behind schedule and likely to get still further behind. No art work has been accomplished. The written guidance for the artist is still only about half done. The lessons and text which are to accompany the slides and other materials are also about half done.

Faced with this situation, Mr. Jones investigated several alternatives including simply cutting down the number of slide-and-text sets which would be produced, hiring another artist to speed the art work, trying to get an extension of time for the project, and a couple of other solutions. After talking it over with the staff, he decided that the best decision would be to hire another artist for the final four weeks of the project. The writers could speed up production of the text, and with two artists working together, the art work could be produced much more quickly. It was not possible to get an extension of time for the project and another artist was readily available from another project which had just ended.

In developing his change memorandum, Mr. Jones detailed how the tasks would be changed with the addition of the new artist. Each artist was now assigned specific slide-and-text sets to do and could work with one of the writers on each one. With such close cooperation between artist and writer, it was possible to eliminate part of the internal review on the sets; each set went through one review instead of two as previously scheduled. The project times were re-estimated; the sets would be available for initial tryout on their originally scheduled date but with the two artists working, it was now possible to have the art work for two sets being done simultaneously. This also produced a change in the dates on which some of the sets were scheduled to be finished. The hiring of the new artist also required the transfer of funds from other parts of the budget to pay his salary. It was planned that there would be a slight increase in artist's supply costs since there appeared to be a need for duplicating equipment between artists but this cost proved to be minimal.

The responsibilities under the new organization were clearly defined and the school system's curriculum director informed of the situation and the solution.

One problem which was identified and which was feared would cause some trouble in the final product was the differences in the artists' styles. The sets could readily be distinguished as to the artist who had done them simply because their styles looked very different. However, in the initial tryouts of several of the sets, this was not the object of unfavorable comments. Thus, the project proceeded ahead and was completed on its scheduled date with all products produced to standard.

Lesson 11--Implementing Changes in Project Operations

Additional Example B

Assume for the purposes of this example that the problem situation is the same as that of Example A. That is, the project to produce overhead projection transparencies is two weeks behind schedule because of the absences of project personnel due to a flu epidemic. In this example, however, the project manager has chosen a different solution from that in Example A.

After examining several alternative solutions, the project manager has decided that it will not be possible to hire an additional artist to help complete the project on time. Still, the transparencies must be completed by the project deadline date since teachers have planned to use them in their classes on certain dates and these transparencies must be done by then. The only alternative which seemed to be viable was to lower the quality of the materials in order to speed up production. After conferring with the project staff and with the teachers who would use the materials, it was decided that the final product could be altered in two ways without substantially affecting their potential performance. First, the drawing and art work on the slides could be simplified. Instead of using slides with complicated cartoon drawings, most reproduced in color, the drawings for the slides would be simplified and would be done in one color only. Secondly, the number of slides per lesson would be reduced. Only the main points would be covered by the slides.

In drawing up his change memorandum, the project director outlined the nature of the changes to be made. Although the goals of the project remained the same, the tasks involved in designing the visuals were somewhat simplified. The figures in the slides did not need to be as complicated, there was no need to use the processing whereby the slides could be done in three colors, and emphasis was placed on charts and diagrams which could be more quickly drawn. This required some change in the work flow since the color processing was no longer part of the work sequence. The speed-up in the writing of the texts which accompanied the slides and the elimination of the lengthy color processing step made possible the revision of the time needed to complete each lesson and the consequent revision of the completion dates for some of the lessons.

The project budget was also affected by the changes. With fewer slides being produced and the substitution of a less expensive one-color reproduction process for a more costly three-color process, the expenditures for producing the final lessons could be lower. This money that was saved was used to pay overtime wages for the project typist so she could get out the written texts that accompanied the slides on time.

The project evaluation system was modified to include provision for comments from users of the materials about whether the lessons would have been better had the original standards been maintained, i.e., if the slides had been in color and there had been more of them. The complete detailed change memorandum was distributed to the members of the staff and their questions answered. The school system's curriculum director was informed of the changes.

The project was completed on time and the evaluation of the final products indicated that the use of fewer one-color slides was acceptable to the teachers and did not produce results substantially different from that planned for the original three-color slides.

Lesson 11--Implementing Changes in Project Operations

Reading References

Additional knowledge about solution or decision implementation can be obtained by reading from the references cited below.

Archibald, R. D., and R. L. Villoria. Network-Based Management S stems. New York: John Wiley and Sons, Inc., 1967, Chapter 17.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 6 and 10.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Charles E. Merrill, 1971, Chapter 10.

Woodgate, H. S. Planning by Network. New York: Brandon Systems Press, 1967, Chapter 8.

Lesson 11--Implementing Changes in Project Operations

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated_________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

   ☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 11--Implementing Changes in Project Operations

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on implementing changes in project operations is now completed. Turn the page and read the directions for Phase Test 3.

PHASE TEST 3

Operational Control Phase

Directions: The following pages contain a series of items which are designed to assist you in assessing the knowledge you have acquired from Lessons 9, 10, and 11 of Module 2. This set of items gives emphasis to cognitive abilities as contrasted to attitudes or skills.

The expectation is that you should answer all items correctly in order to consider your learning in this phase as being complete. In this sense, the test can be considered as a mastery test, a minimum essentials test, or a criterion-referenced test.

Read each item carefully and circle the letter of the best response on the separate answer sheet immediately after this page. After you complete the last item, review your responses then turn to page 23 which contains the answers for the several phase tests and check your answers against those presented there.

Turn the page and begin.

Answer Sheet

for

Operational Control Phase

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
11. A B C D
12. A B C D
13. A B C D
14. A B C D
15. A B C D
16. A B C D
17. A B C D
18. A B C D
19. A B C D
20. A B C D

Operational Control Phase Test

1. Before a manager in a project effort can adequately assess progress and take administrative actions, what must he receive?

   A. Occassional progress reports from each of the work package areas.
   B. A continuous flow of data concerning the exact status of the project at all times.
   C. All project progress data which is available to him.
   D. Timely information which concerns his activities and responsibilities.

2. What are the basic procedures to be followed in updating?

   A. Identify completed events, evaluate completed activities, and replan current activities.
   B. Audit current activities, replan future activities, and reschedule future events.
   C. Identify completed events, evaluate current activities, and re-examine future activities.
   D. Calculate new time estimates, program a new network, and obtain new cost estimates.

3. What is management control?

   A. Assuring that specific tasks are carried out effectively and efficiently.
   B. Collecting, manipulating, and transmitting information.
   C. Reporting financial information about the organization to the outside world.
   D. Assuring that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives.

4. What are the three major subsystems that comprise a control system?

   A. Reports, managements, decision implementation.
   B. Time, cost, performance.
   C. Project definition, network system, activities.
   D. Tasks, activities, dummy activities.

5. Management by exception can be interpreted to mean a manager must study what types of problems?

   A. All key issues brought to his attention.
   B. Key deviations between the plan and execution.
   C. Those presented by superiors without exception.
   D. Problems of exceptional visibility.

6. Management report is one kind of device used to carry out the control function. What should such reports include?

   A. Brief comparison of actual progress against planned progress; improved situation resulted from previous corrective actions; and future status or progress of the project.
   B. Details of task completion which results in the present status of the project and prediction of future status.
   C. Detailed explanation of corrective actions recommended in order to complete all the tasks within the time frame.
   D. Resource shortage due to unexpected and/or uncontrolled circumstances.

7. When does the project manager make use of the control function in project management?

   A. Only after objectives have been determined and a plan set in motion.
   B. Only after a budget has been completed and approved by management.
   C. At all times, even during the project planning phase.
   D. Any time after the first event in the flow chart has been accomplished.

8. How can control be most effectivly exercised during the life cycle of a project?

   A. During the construction of the network and budgeting.
   B. Careful planning of the reporting system.
   C. Designation of points of accomplishment to be monitored.
   D. Measurement and quantification of behaviors.

9. In general, who should be charged with control of an operation within a project?

   A. The management team.
   B. The project manager.
   C. Supervisor of the operation.
   D. Person charged with carrying out the operation.

10. What is the essential factor to be considered in generating new and alternative solutions for a part of the project that is a problem area?

   A. Gather all information and make the decision as quickly as possible.
   B. The manager must know the objective of his decision before he makes that decision.
   C. Gather together a many project staff as possible in order to generate solutions.
   D. Have the necessary control formula built into the planning phase of the project.

11. Listed below are several actions which a manager might take as he responds to a status report. Select the answer which contains the set of major importance.

    1. Alters resource requirements
    2. Analyzes problems
    3. Generates alternative solutions
    4. Implements decisions
    5. Makes decisions
    6. Prepares reports

    A. Acts 1, 2, 3, and 4
    B. Acts 2, 3, 4, and 5
    C. Acts 3, 4, 5, and 6
    D. Actions 4, 5, 6, and 1

12. What is the relationship between management control and the problem-solving process?

    A. No relationship exists.
    B. Problem-solving is not useful to managers but control is.
    C. Control contains elements not found in the problem-solving process.
    D. They can be considered somewhat identical or similar processes.

13. How is a problem defined in the concept of management control?

    A. As a question to which there is no immediate answer.
    B. As a deviation between planned and actual condition.
    C. As a late report coming from a subordinate.
    D. As a process which has gone astray.

14. How does the manager go about establishing whether or not a problem is considered as being important or significant?

    A. By asking the staff member involved in the problem.
    B. Using his own intuitive judgment.
    C. By setting standards or boundaries.
    D. By noting actions of project personnel.

15. Before corrective action can be taken, what step must be taken first?

    A. Assemble the staff together.
    B. Find the cause of the problem.
    C. Generate possible solutions.
    D. Set up a format for reporting solution implementation.

16. What part of the problem-solving process involves the setting of the actions that must be achieved in reaching a solution?

    A. Stating the needs.
    B. Stating the likes.
    C. Examining solutions.
    D. Ranking the alternatives.

17. What is the major function of the change memorandum?

    A. To set forth the problem.
    B. To communicate decisions to project staff.
    C. To notify higher levels of decisions.
    D. To serve as a document for the final report.

18. Thinking about the life cycle of a project, when would one expect the highest number of deviations to occur?

    A. In the initiation of the project.
    B. During the middle operational stages.
    C. At the end of the project.
    D. About evenly distributed in the project.

19. What might cause a small deviation to become a larger one over time?

    A. Failure of some one to report the deviation.
    B. Failure to take action when it was noted.
    C. Failure of management to read forwarded reports.
    D. Any one or all of these.

20. What relationship exists between the planning phase and the operational control phase in the overall project manager operation?

    A. Good planning assists very much in carrying out effective control.
    B. Control is independent of planning.
    C. Planning cannot exist unless control takes place.
    D. Planning is independent of control.

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Lesson 12 -- Project Termination

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Lesson 12--Project Termination

Introduction to Lesson

This lesson contains the following items. Make sure that each item is present before starting to work through the lesson.

Page

A. Booklet for Basic Principles and Techniques of Project Management

Introduction to lesson 12.1
Overview and objectives. 12.2
Pretest. 12.3
Lesson abstract and content outline. 12.6
Lesson text. 12.9
Exercises on project termination 12.18
Post-test. 12.32
Additional examples. 12.35
Reading references 12.37
Lesson Quality Control Form. 12.38

B. Set of Color Slides entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 12--Project Termination."

C. Cassette Tape entitled "Module 2--Basic Principles and Techniques of Project Management, Lesson 12--Project Termination."

EQUIPMENT NEEDED. The following equipment will be required for this lesson and you are advised to arrange for their use:

cassette tape recorder
carousel slide projector
projection screen

TIME REQUIRED. The tape-slide presentation runs approximately 13 minutes, the exercise takes approximately 30 minutes, and about 70 minutes is needed to complete the entire lesson.

Lesson 12--Project Termination

Overview and Objectives

OVERVIEW

The previous lessons have dealt with the planning, preparation, and operational control phases of project management. This final lesson deals with planning the activities that are directed at closing out or terminating the project.

OBJECTIVES

The overall objective of the lesson is to present the student with information and practice about the activities required in terminating a project. Specifically,

1. The student should be able to explain principles of management connected with closing out a project.

2. The student should be able to list the set of activities required in terminating a project.

3. The student should be able to develop a project termination plan.

Read the directions for pretest on the following page.

Module 2
Lesson 12

Lesson 12--Project Termination

Pretest

Directions: Please take time to carefully answer the multiple choice questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D), and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated__________.

1. "Phase out" generally refers to closing out the project at what point?

   A. At the end of school year
   B. When the goal is reached
   C. When project members take new positions
   D. After the evaluation report is completed

2. Who should approve the project phase-out or transition procedures?

   A. Funding agency
   B. Project director and superintendent
   C. Project director
   D. Superintendent and funding agency

3. What procedure or technique is normally used to develop an orderly phase-down of a project?

   A. Evaluation questionnaire
   B. Systematic review of project records
   C. Check list of items to be covered
   D. Memo to the project staff

4. What is usually the major problem in project phase-out or transition?

   A. Preparation of reports
   B. Personnel disposition
   C. Equipment transfer
   D. Staff efforts being diverted to write new proposals.

5. What is the main purpose of a project final report?

A. Describe history of the project in a detailed way
B. Provide documented information on the budget and personnel
C. Provide documented information on the project results for the contractor and other interested parties
D. Provide more information on the project handbook

6. Who should have the major responsibility for making decisions about project records during phase-out?

A. Funding agency
B. Project director
C. Superintendent
D. Superintendent and funding agency

7. What should be a principal focus of the project manager during project phase-out?

A. Writing new proposals
B. Using unspent funds to buy equipment
C. Writing the evaluation report
D. Maintaining staff morale

Indicate whether the statements listed below are true or false by writing T or F on the line.

8. ____Termination refers to the stopping of the project effort even though not all contractual conditions have been met.

9. ____During project phase-out both a project history and project evaluation report must be prepared.

10. ____Project "transition" refers to the case where a project effort or end product is institutionalized into an existing structure.

11. ____During project phase-out, the project manager must delegate the authority to the project senior staff to review the contract carefully with the funding agency.

12. ____During project termination, generally personnel are released in terms of their skill level.

13. ____The major work activity in the production of the project history is gathering more information about project personnel.

14. ____The plan for project phase-out can be copied from previously completed projects.

Check your answers on the following page.

Lesson 12--Project Termination

Directions Following Lesson Pretest

Directions: The correct answers to Lesson 12 pretest are listed down the right margin. The left column is for the first page, the right column is for the second. Check your correct responses. In scoring your answer, if any part of your response is incorrect, the whole item is incorrect for purposes of evaluating pretest performance.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the project termination process and should read the lesson abstract and content outline on pages 12.6 and 12.7. Then begin the tape-slide presentation by turning to the instructions on page 12.8.

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the project termination process and should read the lesson abstract and content outline on pages 12.6 and 12.7. Then if you desire to skip the tape-slide presentation, you may do so by proceeding directly to the practice exercise on page 12.18. If you do desire to view the tape-slide presentation, turn to the instructions on page 12.8.

Multiple Choice

1. B
2. D
3. C
4. B
5. C
6. B
7. D

True/False

8. T
9. F
10. T
11. F
12. T
13. F
14. F

Lesson 12--Project Termination

Lesson Abstract and Content Outline

ABSTRACT

When nearing the end of a project the project manager initiates the activities of closing out the project. A plan for these termination activities is required and includes the project final report, the project history report, disposition of facilities, equipment and supplies, location and reassignment of personnel, sorting and disposition of project records, and final financial accounting.

CONTENT OUTLINE

A. Project termination is the fourth phase of project management mission and can be one of three types.
   1. It consists of a phase-out or completion of contract.
   2. It is a termination or cut-off of effort due to lack of funds or other causes.
   3. It is a transition or institutionalizing of the project product.

B. Various project activities are undertaken during project termination. These are:
   1. Disposition of equipment and facilities,
   2. Final report preparation,
   3. Records retention,
   4. Personnel transfer,
   5. Project history,
   6. Contract review, and
   7. Orderly phase-down of activities.

C. A phase-out or transition plan is needed for orderly termination.
   1. The plan is prepared near the final one-third of project time.

2. The plan is to be approved by the parent organization and the customer.

3. The plan includes a checklist to make sure that necessary items are covered

D. Major areas of concern in a termination plan are:

1. Personnel disposition,

2. Equipment and facilities disposition,

3. Payment of bills and final financial accounting,

4. Final report preparation,

5. Project history preparation, and

6. Records identified for retention and for disposal.

E. A few termination problems for the project manager to be concerned with are:

1. Unusually high energy devoted to a new proposal.

2. Lowered staff morale and commitment.

3. Unnecessary spending of project funds.

Turn to the presentation instructions on the following page, or if going directly the the lesson exercises, turn to page 12.18.

Lesson 12--Project Termination

Instructions

1. *Set up the recorder, projector, and screen.*
2. *Place the carousel slide tray onto the projector and advance the tray to the start of "Basic Principles and Techniques of Project Management--Lesson 12, Project Termination."*
3. *Place the cassette tape for this lesson into the recorder and rewind to the rewind stop.*
4. *Start the recorder and advance the slides with the "change tone."*

Lesson 12--Project Termination

Lesson Text

Introduction

As project operations approach the attainment of the goals established for the project, attention must be given to project termination. This lesson concentrates on those activities with which the project manager must be concerned during this fourth and final phase in the project life cycle.

Every project, by definition, has a finite life. A project ends when the goal is reached or the end product is produced. Three basic situations arise when talking about ending a project and various words have been coined to refer to these situations. Phase-out generally refers to closing out the project when the goal is reached. Termination, although generally refering to the ending of a project, can also be used to refer to the specific case of the stopping of the project effort even though not all contractual conditions have been met. This may occur if funding is cut off or if there is a failure to satisfy the terms of the contract. Transition refers to the case where a project effort or end product is institutionalized into an existing structure and becomes an on-going operation or program. The primary concern in this lesson will be on the situations where the contractual conditions have been met and the project effort is either to be phased out or transitioned into an on-going operation.

Transition/Phase-Out Plan

Regardless of whether a project is involved in transition or phase-out, the project manager must give attention concurrently to several items. Among these are informing project personnel of phase-out or transition procedures;

arranging for the disposition of project equipment and facilities; preparing and writing a final report for the contractor or funding agency; determining which records, reports and similar documents are to be retained, as required by the funding agency, contractor or parent organization; arranging for the transfer of permanent project personnel and the termination of temporary personnel; settling outstanding bills; preparing and writing a project history for reference by other project directors; reviewing the contract carefully with the customer to be sure that all conditions have been met or that mutually satisfactory arrangements have been made; and supervising the orderly completion of remaining project activities and operations.

In order to insure that these activities are performed, a plan for project transition or phase-out should be prepared in advance of the comletion of the project. Although no specific time can be given as to when such a plan should be prepared, a rule-of-thumb might be to have the plan developed near the date for the beginning of the final third of the operations phase. The plan, once developed, might have to be approved by both the funding agency (or customer) and the parent organization.

The actual phase-out, or transition, requires close coordination between the functional managers of the parent organization and the project manager, so that adequate integration of released resources into on-going programs can be achieved. In order to facilitate an orderly phase-out or transition, it is advisable to develop a checklist of items to be covered in the phase-out or transition plan. The checklist should include the four major areas of personnel disposition, facilities and equipment disposition, final report and project history preparation, and the management of project records.

Personnel Disposition.- A major responsibility of the project manager is to conduct a smooth transfer of the project staff to other work activities. Thus, personnel disposition is of prime concern in project phase-out or transition. As projects near completion, project personnel often express anxiety about their future. Two means for relieving anxiety about job security are the careful initial selection of personnel and assistance in transfering them to other work activities during project phase-out. Careful initial selection means identifying personnel with skills and experience that can be easily transferred to other functional departments, or even to other projects. The disposition of temporary personnel is handled by making active efforts to inform other projects and departments of their qualifications and availability by formal or informal means.

Facilities and Equipment Disposition.- The disposition of facilities and equipment can be a formidable problem for the project manager. Information should be specified for each item regarding its location, current condition, when it will be available, and any limitation on its use. Project facilities and equipment are often transferred to other projects, departments, or inventory, or (if permitted), retained by the functional personnel in the immediate area housing the project. In most cases, the funding agency retains title to selected equipment or facilities and informs in project of the manner of its disposition.

Final Report.- In either the phase-out or transition situations attention must be given to the production of the project final report. Such a report provides documented information on the results of the project for the funding agency and other interested institutions and individuals. The two main sections of the report are the narrative and the appendix.

The narrative can be sub-divided into the subsections of identification data and body. Identification data consists of such items as a cover, title page, acknowledgments, abstract, list of figures, list of tables and disclaimers. The body contains a review of project activities covering such areas as objectives, procedures, problems, data, recommendations and conclusion.

The appendix usually contains original data, tables, charts, special data collection instruments, and similar items supporting the narrative but not of interest to all readers. A budget summary may be included if requested by internal or external organizational units.

In addition to preparing the final report document, procedures for disseminating copies of it to both internal and external offices concerned with the project should be specified.

Project History.- Attention must also be given to the preparation of a project history. The project history provides a documented written record of the history of the project from its creation to its termination. Properly prepared, it can help in the planning of new projects by providing information derived from experience regarding dimensions of uncertainty in a new project.

The project history is created from items such as progress reports, minutes of staff meeting, internal memos, and personal recollections. Although the final report can serve as the project history, some parent organizations require a separate document. In contrast to project final reports, procedures and format for the preparation of the project history are not nearly as formal. Style and format are at the discretion of the project staff. Typically, however, a project history includes such items as a project description, contract negotiations, significant problems, their cause and corrective actions, personnel, list of publications and reports, and recommendations for future projects. The major work activities in the production art work, typing, reproducing, and disseminating. Time and resources should be allowed in the original project planning to carry out these activities.

Project Records.- The management of project records is a major area of responsibility for the project manager. He must decide which documents such as correspondence, requisitions, memos and personnel appointments should be retained and which ones can be destroyed or purged. The decision often employed is to retain only those documents which the funding agency, parent organization, auditor or project manager require or desire for the justification of project action.

Typical items that might be retained include the contract and all agreements, budget expenditure reports, personnel appointment papers, travel reimbursements, original test data, correspondence or memos noting major project changes, progress and final reports, and items required by auitors and the parent organizations. Typical items which might be discarded are draft copies of working papers, working copies of documents, and travel duplicates.

Transition

As stated earlier, although both project phase-out and transition situations have many common elements, project transition does have special considerations to which attention must be given. Since transition is a form of institutionalizing a change, the project director and his staff should be prepared to deal with the typical concerns and axiety that are present whenever change is introduced into the body of an organization. The project manager must adequately orient the users to the new process or procedures, dispel rumors or threats to job security, and facilitate a gradual change from old to new practices.

Phase-Out

In the case of project phase-out, the project director must be prepared to recongnize and prevent frequently-ocurring problems One problem is the tendency of project personnel to put time and energy into developing new proposals in an attempt to provide for job security. Consequently, current project efforts are often allowed to slip. A second problem is that the staff, knowing the project is to be phased out, may develop low morale and consequently lower their commitment to the project. A third problem is the tendency to "use up" any unexpended funds by buying possibly useless materials or equipment.

Summary

A plan for project phase-out or transition should be created and implemented. The plan may have to be approved by both the project parent organization and funding agency. The plan should cover personnel disposition, facilities and equipment disposition, report preparation, and the disposal and retention of project records.

During phase-out, the project manager should focus his primary attention upon effectively concluding the project, as well as being concerned with current activities, staff morale, and the possible waste of resources. When properly handled, concluding activities can mark the completion of a highly successful and well-managed project.

Turn to page 12.18 and read the directions for Exercise A.

Lesson 12--Project Termination

Exercise A

Directions: Attached as pages 12.20 through 12.24 is the outline of a proposal which you can assume is to be funded. Study the proposal carefully, then indicate how one might plan to handle items A through F on the following two pages.

A. Disposition of the case reports to which reference is made:

B. Disposition of teacher aides identified in the proposal:

C. Disposition of the Gates-MacGintie Reading Tests and the basal reader series to which reference is made:

D. Disposition of memos and/or minutes originating from the meetings with the reading consultant:

Continue on next page.

E. Disposition of the Hoffman Reading Machines noted in the Budget Section:

F. Being a good project manager, Mr. Smith decides to outline early the contents of the final report. He decides that the following items would be included. For each item listed, indicate if you agree or disagree with its placement in the report. If you disagree, give a reason for so doing in the space provided.

	Agree	Disagree
1. Written monthly report submitted by personnel.	___	___
2. Description of measurement techniques and how they were employed.	___	___
3. Objectives C and D relating to support services.	___	___
4. Summary of amount paid in retirement funds.	___	___

Turn to page 12.25 and check your work.

Non-Public Reading Proposal

Subsection II. Program Activities

1.1 Subject to be taught
Remedial Reading

1.2 Grade levels
Grades 3 to 6 inclusive
Grade 3--36 pupils
Grade 4--32 "
Grade 5--33 "
Grade 6--36 " Total: 137 pupils

1.3 Needs of children

A. A strong foundation in reading. Attention will be given to children who have fallen below grade level in reading and who therefore need remedial reading assistance.

B. More individual attention from classroom teachers.

C. Greater parental understanding of the role of the school in their children's lives.

D. Increased medical and dental care.

1.4 Objectives of the program

A. Bring children with reading deficiencies up to their proper grade levels.

1. To constantly strive to place each child on his reading level expectancy.
2. To take into account individual differences to provide flexible and adaptable reading instruction based upon the student's background, academic achievement, reading level, desires, motivation and potential ability.
3. To help the student who needs visual and auditory perceptual development.
4. To help students develop the basic sight vocabulary.
5. To help the student use independent word attack skills through the use of phonic structural analysis.
6. To help the student maintain phonic and word-learning skills by the introduction of informal activities.
7. To help students recognize their own reading errors and be interested in correcting them.
8. To produce students who will seek help when they have a need of it.
9. To help the student achieve effective oral reading skills.
10. To provide stories associated with the student's personal experiences and interest level.

Non-Public Reading
Subsection II. Program Activities

11. To help the student to comprehend the meaning of words, phrases, and sentences.
12. To help the student become aware of sequence relationships in sentences.
13. To help the student develop a recognition of the pronoun referent in comprehending sentence meaning.
14. To help the student to recall details by identifying problems, anticipating action, comparing and contrasting, and summarizing ideas.
15. To help the student to read to the end of the sentence or paragraph without interruption.
16. To help the student identify main ideas in paragraphs and stories.
17. To help the student organize, summarize and assimilate ideas gained through his reading.
18. To help the student make generalizations, inferences, judgments and to draw conclusions from them.
19. To help develop students' self-confidence by correcting their reading difficulties.

B. Have as many of these children as possible performing at their appropriate grade levels in other academic subjects which involve reading.

C. Increase the degree of cooperation between parents and schools.

D. Provide identification and treatment, where possible, of medical, biological, psychological, and educational problems which may be causing problems in reading.

1.5 Program Procedures

A. Provide small group instruction in reading to supplement the regular classroom program by hiring additonal reading teachers.

B. Provide teacher aides so that teachers can devote more time to individualized instruction.

C. Increase contacts between the home and school through increased home and school visitor and allied services.

D. To provide additional psychological and medical services.

1.6 Program Staff
2 teachers of reading
4 teacher aides--one from each school
support services as needed (refer to 2.3)

Non-Public Reading
Subsection II. Program Activities

1.7 Measurement Techniques

The program objectives will be measured by the teacher through the use of

a) personal interviews
b) check lists
c) behavioral charts
d) simple questionnaires
e) summaries--teacher and student

Students will be required to follow the regular testing program of SRA Achievement Series and Primary Mental Ability Series. An additional test, namely Gates MacGintie Reading Tests will be administered at the outset and at the conclusion of the program to all children involved in this reading program.

In addition to these tests, the tests accompanying the basal reader series will be administered during the program. Also, informal tests such as those found in magazines and newspapers and those developed by the classroom teacher will help determine the reading progress of the student.

Teachers will maintain written records and will submit monthly reports. Results of the use of teacher aide services will be evaluated in written monthly reports of their activities. The home and school visitor will prepare case reports on the procedures used and outcomes achieved.

2.1 Support Services

Home School Visitation

guidance counselor
sociologist
psychologist
health services--medical (visual, auditory, general fitness examination)

2.2 Support Services Objectives

Objectives A and B above are instructional in nature; Objectives C and D are supportive. This latter is directed toward problems which can hinder the attainment of the instructional objectives. Objective C will be directed to removing social and family problems. Objective D will be directed to improving health by overcoming medical problems.

2.3 Support Services Procedures

The home and school visitor will be assigned to the cooperating schools to provide services in addition to those already provided by the school district.

Non-Public Reading
Subsection II. Program Activities

The health personnel will examine children for possible physical deterrents to learning and, where possible, provide for correction.

The services of a guidance counselor, a psychologist and sociologist may be required to deal with personality and home problems which may be causing the reading problems.

The services of these individuals should be available when required.

2.4 Support Services Staff
1 Home School Visitor
Health personnel services as needed
Other supportive services, e.g., psychologist, sociologist, guidance counselor, as needed.

2.5 Support Services Measurements and Techniques
All Title I personnel submit written monthly reports.
Support personnel will indicate activities engaged in, number of cases treated and progress and outcomes for those cases. An end of the year summary provides a total picture of accomplishment.

3.1 Inservice Programs
Reading teachers and aides will meet with the reading consultant to be oriented to the working of the program, viz., the problems and needs of the children and the manner in which these needs will be met and the problems attacked.

Reading teachers and aides will also meet with the teachers of grades 3 to 6 to explain the manner in which they will try to remediate the children's reading difficulties. Reading teachers, aides, home visitors and building principals will meet periodically for purpose of review and modification of program.

3.2 Consultants
The services of consultants are a necessary part of this program. A reading consultant will be available to advise reading teachers when problems are encountered and to orient the regular classroom teachers as to their roles in the program--e.g., supportive, etc.

Non-Public Reading--1970-1971

Budget

		SALARIES	OTHERS	CONTRACTED	TOTAL
Instructional (200)					
231	1 Supervisor or Consultant (Inservice) 12 hours			$ 132.	
213	2 Teachers	$19,000.			
213	2 Teachers (Inservice) 12 hours	132.			
218	2 Teacher aides	6,400.			
218	2 Teacher aides (Inservice) 12 hours	60.			
222	Ginn--360 Readers		$ 3,000.		
222	Gates-MacGinitie Tests		50.		
222	Other tests		100.		
222	Instructional Supplies		400.		
222	48 Sets Hoffman Reading Kits at $99.		4,752.		
221	4 Johnson Kress Reading Series Primary		250.		
221	4 Johnson Kress Reading Series Intermediate		250.		
231	Educational Conferences		150.		
239	Other expense--mileage		250.		
	Total Instructional				$34,926.
Attendance (300)					
312	1 Home-School Visitor	4,500.			
330	Other expense--mileage		150.		
					4,650.
Fixed Charges (800)					
831	Retirement		1,175.		
832	FICA		1,175.		
833	Workmen's Compensation		100.		
834	Insurance--Staff		750.		
	Total Fixed Charges				3,200.
Equipment (1200)					
1243	8 Hoffman Reading Machines $385. ea.		3,080.		
1243	8 Listening Sets $69. ea.		552.		
	Total Equipment				3,632.
	Total Budget	$30,092.	$16,184.	$132.	$46,408.

Elementary Guidance Activity Contribution: 1 Guidance Counselor

Lesson 12--Project Termination

Exercise A--Solution

Directions: The solution given below is one of many possible solutions. Compare your answers with those below, realizing that your's need only approximate these.

A. Disposition of the case reports to which reference is made:

The student case reports will be transferred to appropriate building principals and filed with student folders. These reports need to be available to educational staff in relating to the students.

B. Disposition of teacher aides identified in the proposal:

It may be assumed that the project's remedial reading program will become integrated into the school district's reading program. This assumption is justified due to the current emphasis on individual instruction and the great potential offered by such a program. Consequently, the teaching aides will be reassigned as school district employees under the instruction title of the district's appropriation measure and provided that funds are available.

C. Disposition of the results and the used Gates-MacGintie Reading Tests and the basal reader series to which reference is made:

The results of the tests will be entered into the student's permanent school record. The test instruments, once used, will be destroyed at the conclusion. The basal reading series will be retained in the classroom.

D. Disposition of memos and/or minutes originating from the meetings with the reading consultant:

The memos and minutes dealing with the reading consultant will be reviewed. The majority will be discarded while the more important ones will be placed in a file for reference. The more important ones to be saved might refer to problems and their method of solution.

E. Disposition of the Hoffman Reading Machines noted in the Budget Section:

The funding agency and the parent organization will enter into a written agreement about disposition of these machines. The project manager will write a letter proposing that the machines be turned over to the school district for inventory control and for use in their reading program.

F. Being a good project manager, Mr. Smith decides to outline early the contents of the final report. He decides that the following items would be included. For each item listed, indicate if you agree or disagree with its placement in the report. If you disagree, give a reason for so doing in the space provided.

Agree Disagree

1. Written monthly report submitted by personnel. (Reason for rejection if disagreement): ___ ___

Disagreement is correct here since there is no real need to include the monthly reports as such. It would be useful to include a summary regarding the use and role of the monthly reports in the project.

2. Description of measurement techniques and how they were employed. (Reason for rejection if disagreement): ___ ___

(Agreement)

3. Objectives C and D relating to support services. (Reason for rejection if disagreement): ___ ___

(Agreement)

4. Summary of amount paid in retirement funds. (Reason for rejection if disagreement): ___ ___

Either answer is correct here since some project final reports will include cost summary while others do not. The project manager should find out from the funding agency early if a cost summary is to be included in the final report or if it will be handled in some other manner.

Go on to Exercise B on the next page.

Lesson 12--Project Termination

Exercise B

Directions: Correct the termination plan on page 12.28 and 12.29 by drawing a line through the inadvisable items and by adding in the space provided under "VI Additional Items" those items which are missing.

SETTING

The project on Individual Reading, Title I ESEA, for the Metropolitan School District is nearing its completion. The project activities will be absorbed into the elementary reading program of the school system. Jim Barnes, a project manager-in-training, has been assigned to you for the purpose of gaining management experience. You have directed him to study a set of self-instructional materials on project management (EPMIS). Upon completion of the lesson on project termination, you have requested that he prepare an outline of a termination plan for your reading project.

The termination plan activities listed by the manager-in-training are given below. Certain of these activities are not advisable while others have been inadvertantly omitted.

Termination Plan

I. Final Report

   A. Collect as supporting information for the report writing task, statements about project procedures problems, recommendations, and conclusions.

   B. Write an outline of the final report using the project staff.

   C. Direct the staff to write detailed descriptive reports of their work and submit these as appendices to the report.

II. Disposition of facilities, equipment, and supplies

   A. Have contracting agency specify the items to be returned to them.

   B. Have project staff declare preference so that equipment and supplies can be distributed for personal use.

   C. Get directions from parent organization on items that are to be turned over to the school district.

III. Report of Project History

   A. Make a list of procedures that proved especially helpful for the project.

   B. Make a list of the problems encountered and the methods used for solutions.

   C. Compile a set of the more important documents, forms, and staff meeting notes.

IV. Project Bills and Financial Account

   A. Note the outstanding bills and commitments and arrange for payment.

   B. Financial arrangements

      1. Direct extra effect at recording payments and projecting obligations up to the project terminal date.

      2. Order equipment and supplies the last few days so that all the project money is spent.

V. Project Records

   A. Mail the project records (originals or duplicates) to the contracting agency.

B. File in permanent storage files the more important project documents such as contracts, expenditures, personnel papers, some correspondence, and reports.

C. Transfer unimportant project records to the parent organization for disposition.

VI. Additional Items

Lesson 12--Project Termination

Exercise B--Solution

Directions: The items that you should have crossed out in each section are listed below. Some items that you might have added are listed under "Additional Items." Check your answers.

Termination Plan

I. Final Report

cross out c. Direct the staff to write detailed descriptive reports of their work and submit these as appendices to the report.

II. Disposition of Facilities, Equipment, and Supplies

cross out B. Have project staff declare preference so that equipment and supplies can be distributed for personal use.

III. Report of Project History

(all items are advisable)

IV. Project Bills and Financial Account

cross out B. 2. Order equipment and supplies the last few days so that all the project money is spent.

V. Project Records

cross out A. Mail the project records (originals or duplicates) to the contracting agency.

cross out C. Transfer unimportant project records to the parent organization for disposition.

VI. Additional Items

- A. Personnel disposition
  - 1. Counsel each staff person regarding: school systems positions available, personal growth, strengths, and needs.
  - 2. Assist in job placement of (deserving) staff members.
- B. Dissemination activities
  - 1. Submit the project report and supporting documents to ERIC.
  - 2. Mail an abstract of the project to the specified educational distribution list.

Turn the page and proceed.

Lesson 12--Project Termination

Directions and Choices Following the Practice Exercise

Based upon the self-evaluation of your performance on the exercise you have either:

A. *acceptably satisfied the objective of developing a project termination plan and should now turn to the post-test found on page 12.32.*

An additional example dealing with termination activities is found beginning on page 12.35. References for additional reading are listed on page 12.37.

B. *not satisfied the objective, and should select one or more of the following courses of action.*

   1. *If your plan was correct except that it did not arrange for transfer of personnel, then either:*

      a. *Study the additional example beginning on page 12.35 and then rework exercise B on page 12.27.*

      b. *Read Chapter 12 of Educational Project Management by Desmond L. Cook and then rework exercise B on page 12.27.*

      c. *Rework exercise B on page 12.27.*

   2. *If your plan was not correct in various sections, then either:*

      a. *View the slide-tape presentation; instructions are on page 12.8. After the presentation, rework exercise B on page 12.27.*

      b. *Read the lesson narrative beginning on page 12.9. After reading, rework exercise B on page 12.27.*

Lesson 12-- Project Termination

Post-Test

Directions: Please take time to carefully answer the multiple choice and true/false questions given below. For the multiple choice questions you are to circle one correct or best answer (A,B,C or D) and for the true and false you are to indicate the correct response with the letter T or F.

Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated______.

1. What is usually the major problem in project phase-out or transition?

   A. Preparation of reports
   B. Personnel disposition
   C. Equipment transfer
   D. Staff efforts being diverted to write new proposals

2. What procedure or technique is normally used to develop an orderly phase-down of a project?

   A. Evaluation questionnaire
   B. Systematic review of project records
   C. Checklist of items to be covered
   D. Memo to the project staff

3. Who should approve the project phase-out or transition procedures?

   A. Funding agency
   B. Project director and superintendent
   C. Project director
   D. Superintendent and funding agency

4. "Phase-out" generally refers to closing out the project at what point?

   A. At the end of school year
   B. When the goal is reached
   C. When project members take new positions
   D. After the evaluation report is completed

5. Who should have the major responsibility for making decisions about project records during phase-out?

   A. Funding agency
   B. Project director
   C. Superintendent
   D. Superintendent and funding agency

6. What should be a principal focus of the project manager during project phase-out?

   A. Writing new proposals
   B. Using unspent funds to buy equipment
   C. Writing the evaluation report
   D. Maintaining staff morale

7. What is the main purpose of a project final report?

   A. Describe history of the project in a detailed way
   B. Provide documented information on the budget and personnel
   C. Provide documented information on the project results for the contractor and other interested parties
   D. Provide more information on the project handbook

Indicate whether the statements listed below are true or false by writing a T or F.

8. _____ During project phase-out both a project history and project evaluation report must be prepared

9. _____ Project "transition" refers to the case where a project effort or end product is institutionalized into an existing structure.

10. _____ Termination refers to the stopping of the project effort even though not all contractual conditions have been met

11. _____ The plan for project phase-out can be copied from previously completed projects.

12. _____ The major work activity in the production of the project history is gathering more information about project personnel.

13. _____ During project termination generally personnel are released in terms of their skill level

14. _____ During project phase-out, the project manager must delegate the authority to the project senior staff to review the contract carefully with the funding agency.

Turn the page and check your answers.

Lesson 12--Project Termination

Directions and Choices Following Lesson Post-Test

Directions: The correct answers to Lesson 12 post-test are listed down the right margin. The left column is for the first page, the right column is for the second. Check your correct responses. In scoring your answer, if any part of your response is incorrect, the whole item is incorrect for purposes of evaluating post-test performance.

Directions: If you answered eleven or less questions correctly, you have not acceptably demonstrated knowledge of the project termination process and should select one or more of the following courses of action:

1. *View the slide-tape presentation by turning to page 12.8 and proceeding. After the presentation, turn to the Lesson Quality Control Form on page 12.38.*
2. *Read the lesson narrative beginning on page 12.9. After reading the narrative, turn to the Lesson Quality Control Form on page 12.38.*
3. *Study the additional example beginning on page 12.35 and then turn to the Lesson Quality Control Form on page 12.38.*
4. *Rework the lesson post-test and then turn to the Lesson Quality Control Form on page 12.38.*

Directions: If you answered twelve or more questions correctly, you have acceptably demonstrated knowledge of the project termination process and should now turn to the Lesson Quality Control Form on page 12.38. References for additional reading are listed on page 12.37.

Multiple Choice

1. B
2. C
3. D
4. B
5. B
6. D
7. C

True/False

8. F
9. T
10. T
11. F
12. F
13. T
14. F

Lesson 12--Project Termination

Additional Example

The following set of memorandums presents a problem that could have been avoided by proper planning for the termination of the project.

MEMO "A" TO: P. P. Gross, Project Manager, Instruction Development Project for Technicians

FROM: J. J. O'Connell, Business Director, Metropolitan Schools

DATE: August 1

I have received a phone call from the Educational Research Laboratory, the contractor, asking that the camera purchased for the project be returned to them by August 15. Please Comply.

MEMO "B" TO: Phone conversation--person called: J. J. O'Connell

FROM: P. P. Gross

DATE: August 2

The camera as well as other equipment and unused supplies from the Instructional Development project was turned over to R. Turner of your office on July 10. The camera was a Crafters, 35 mm, f 1.7 lens, serial number C27125.

MEMO "C" TO: P. P. Gross

FROM: R. Turner

DATE: August 5

1. The Crafters, 35 mm Camera, serial number C27125, has been checked out by the school's Archeology Club for their Far West Study Trip which extends from July 25 to August 30.
2. The camera has been entered into the school's capital inventory control as item 71-23 which requires an authorized transfer document to remove from the inventory.
3. Please submit a copy of that section of the project contract which deals with disposition of the project equipment so that this controversy can be resolved.

MEMO "D" TO: R. Turner

FROM: P. P. Gross

DATE: August 8

1. The project contract states that the contractor and school district (representative) will develop a mutual agreement concerning disposition of equipment items identified in Section 1200 of the proposal budget.

2. The project files have already been reduced to a few folders (correspondences and documents) and no record has been found concerning the mutual agreement concerning equipment disposition. Is it possible that the Business Office represented the school in the agreement and that your copy will resolve the problem?

MEMO "E" TO: P. P. Gross

FROM: J. J. O'Connell

DATE: August 14

1. Our files show no record of correspondence between the contractor and Metropolitan Schools concerning equipment disposition for the Instructional Development Project.

2. Our only recourse is to communicate with the contractor and obtain the "mutual" agreement at this time. Apparently the contractor will want the camera and this statement will serve as authority for us to execute a transfer document to remove the camera from our inventory.

3. I hope that the delay will be acceptable to the contractor and that the camera is in working order.

4. You are asked to communicate with the contractor and attempt an agreement that would permit the Metropolitan Schools to retain the camera as it is especially useful in our new programs. Failing this arrangement, you are to draft a letter for the superintendent's signature offering apologies for the misunderstanding and the delay in getting the camera to them.

Lesson 12--Project Termination

Reading References

Additional knowledge about project termination and/or phase-out can be obtained by reading from the references cited below.

Baumgartner, J. S. Project Management. Homewood, Ill.: Richard D. Irwin, Inc., 1963, Chapter 12.

Lesson 12--Project Termination

Lesson Quality Control Form

Directions: Please take time to carefully answer the four questions given below. Your answers will provide valuable information for the revision and improvement of this lesson. Feel free to write additional comments or recommendations on the back of this form. Your responses will be kept strictly confidential. Please write the last four digits of your Social Security number on the line below so that the pages can be identified in the event they become separated________.

Thank you for your assistance.

1. Indicate your overall impression of the quality of this lesson.

☐ Excellent ☐ Very Good ☐ Good ☐ Fair ☐ Poor

2. What do you feel is the most positive aspect of this lesson?

3. What do you feel is the most negative aspect of this lesson?

4. What would you suggest to improve this lesson?

Turn the page and proceed

Lesson 12--Project Termination

Termination Instructions

Upon completion of the Lesson Quality Control Form, you are to:

Tear out and staple the pages of the Lesson Quality Control Form.
Place the form in the special envelope provided.
Mail the envelope to Research for Better Schools, Inc., Suite 1700, 1700 Market Street, Philadelphia, Pennsylvania 19103.

This lesson on project termination is now completed. The module on Basic Principles and Techniques of Project Management is complete. Turn the page and read the directions for Phase Test 4.

PHASE TEST 4

Project Termination Phase

Directions: The following pages contain a series of items which are designed to assist you in assessing the knowledge you have acquired from Lesson 12 of Module 2. This set of items gives emphasis to cognitive abilities as contrasted to attitudes or skills.

The expectation is that you should answer all items correctly in order to consider your learning in this phase is complete. In this sense, the test can be considered as a mastery test, a minimum essentials test, or a criterion-referenced test.

Read each question carefully and circle the letter of the best response on the separate answer sheet immediately after this page. After you complete the last item, review your responses then turn to page 24 which contains the answers for the several phase tests and check your answers against those presented there.

Turn the page and begin.

Answer Sheet

for

Project Termination Phase

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
11. A B C D
12. A B C D
13. A B C D
14. A B C D
15. A B C D
16. A B C D
17. A B C D
18. A B C D
19. A B C D

Project Termination Phase Test

Items 1 through 10. Given below are the four major elements of a termination plan to be used as responses for the items indicated. For each item listed, you are to indicate into which element of the plan it would best be placed.

A. Personnel disposition
B. Facilities disposition
C. Final reports
D. Records retention

1. Draft copies of working papers.

2. Original test data.

3. Copies of test instruments.

4. Vita or biographical sketches of project personnel.

5. Release of an instructional aid drawn from a parent group.

6. Release of an office used by the project evaluator.

7. Copies of the monthly project budget summary statement.

8. Reassignment of project director to teaching duties.

9. Notification of staff availability.

10. Textbooks used in course of project.

The following items should be answered by A if you feel the answer is Yes and by circling B if you feel it is wrong or incorrect.

11. Disposition of personnel is the most difficult area in phasing out a project.

12. A project cost or budget summary may be included as part of the final report.

13. The project history is a formal document required by the funding agency.

14. Low staff morale may be experienced as the project comes to an end and project personnel are unsure of their next position.

15. A termination plan should be approved by both the project director and the contractor.

16. What item developed during the phase-out of a project usually contains the special data collection instruments used in the project?

    A. Termination plan.
    B. Final Report Appendix.
    C. Project History.
    D. Records Retention Plan.

17. Who might be given copies of the project history once it is developed?

    A. Project staff.
    B. Superintendent.
    C. Future project directors.
    D. All of these persons.

18. To what situation is the term termination usually applied?

    A. Normal ending of a project.
    B. Absorption of the project end product into the school district.
    C. Stopping of a project effort even if not finished.
    D. Period of activity involved in phase-out of a project.

19. Who is responsible for developing the plan for closing the project?

    A. Project director.
    B. Funding agency.
    C. Agency housing the project.
    D. Superintendent.

DM 109

EDUCATIONAL
PROJECT
MANAGEMENT
INSTRUCTIONAL
SYSTEM

EPMIS

MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Volume III - Case Simulation

C. PETER CUMMINGS & DESMOND L. COOK

RESEARCH FOR BETTER SCHOOLS, INC.
Administering for Change Program
1700 Market Street Philadelphia, Pa. 19103

and

FACULTY OF EDUCATIONAL DEVELOPMENT
Educational Program Management Center
The Ohio State University

THESE MATERIALS DEVELOPED BY

C. Peter Cummings
and
Desmond L. Cook

Assisted By

Steven Gyuro
Rodney J. Ball

PROJECT MANAGEMENT COMPONENT
C. Peter Cummings, Director

ADMINISTERING FOR CHANGE PROGRAM
Sanford Temkin, Director
Mary V. Brown, Deputy Director

RESEARCH FOR BETTER SCHOOLS, INC.
Robert G. Scanlon, Executive Director

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MODULE TWO

PROJECT MANAGEMENT BASIC PRINCIPLES

Simulation Manual

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
1700 Market Street
Philadelphia, Pennsylvania 19103
May 1973

Simulation Manual

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Preface

This manual contains two major sections titled (I) Simulation Description and (II) Simulation Instructions, Checklists, and Forms.

The Simulation Description section presents the goals, describes the elements and materials of the simulation, and gives general directions for using the simulation.

The Simulation Instructions, Checklists, and Quality Control Forms section contains instructions for working through the several phases of the simulation, checklists for evaluating your answers to the simulation problems, and the Quality Control Forms.

Please read the Simulation Description section first before beginning any part of the simulation.

Directions: If you are working through the simulation alone, start by reading the next section.

If you are completing the simulation with a group, wait for directions from the group leader.

I. Simulation Overview

A. Goals

It is the basic purpose of the simulation to provide the student with an opportunity to integrate or synthesize his knowledge and skills regarding project management. It seeks to accomplish this by providing a semi-realistic project setting which simulates many of the decisions and actions which a project manager must take. The simulation is divided into four phases which correspond to the four general steps of project management: planning, preparation, control, and termination. Goals for each phase are described below.

In the planning phase, the student is expected to integrate the various skills necessary to carry a project through from its initial definition of objectives to the final writing of a budget for the project proposal. Included here are such tasks as constructing a work flow chart with time estimates, a work breakdown structure, and a task-event-resource calendar.

In the preparation phase, the student must pull together the many diverse activities which are necessary as a result of the project being funded. The student should be able to see the interrelationships between such discrete tasks as writing a management responsibility guide, describing a management information system, and delineating needs for facilities, equipment, and personnel.

In the control phase, the student must integrate the steps involved in controlling a project and solving problems which arise in the course of the project. Solving a problem and implementing a solution should be one smooth, on-going process.

In the termination phase, the student must integrate the skills associated with terminating a project. He should see the interrelationships between the termination plan, final report, and project history.

B. Components

The simulation consists of this manual, setting manual, and four phase booklets corresponding to the four management steps of planning, preparing, controlling, and terminating a project. Each of the phases consists of an introduction, an abstract of the problem situation, documents which present facts concerning the problem, and forms for student responses. Also associated with each phase is a checklist for evaluating answers and a quality control form to evaluate the phase. These last two items are contained in this manual.

A brief description of the content of the simulation setting and the four phase problems is provided below.

Setting. The school system of the city of Armitage in the state of New Hopewell is described. The main characters who will appear throughout the rest of the simulation are introduced. Various innovations in the school system such as the Project Management Office and the environmental education curriculum are also described and the basic situation concerning the need to produce instructional aids in environmental education is presented.

Phase A--Planning the Project. This phase focuses on the activities involved in planning a project. It follows directly from the situation set up in the setting booklet. A proposal has been written for a project to develop instructional materials such as film loops and cassette tapes on environmental education topics to alleviate the shortage of such materials. The student, in the role of the project manager, must rewrite portions of the draft proposal to correct certain deficiencies.

Phase B--Preparing the Project. A final revised version of the proposal has been submitted to the New Hopewell State Department of Education and approved for funding. Upon the approval of the proposal for funding, certain actions need to be taken to implement the project. The student, in the role of the project manager, must submit information concerning the hiring of personnel, the establishment of a project information reporting system, the space and facilities needs of the project, and other items of information.

Phase C--Controlling the Project. This phase is chiefly concerned with solving a problem which arises in the courses of the project which, if not solved satisfactorily, could end the project's existence. The project has been progressing essentially according to plan when a bill is received from a professional film studio which would make the costs of the film considerably greater than expected. An alternative way of making the loops must be found and the student, in the role of project manager, must construct a change memorandum.

Phase D--Terminating the Project. After solving the problem of producing the film loops on the limited funds left, the remaining film loops are made and tested in several schools. Since the end of the project is now approaching, the student, in the role of the project manager, must construct a termination plan and outline a final report and project history.

C. Materials and Equipment

Materials Needed

You will need the following materials to complete the simulation:

a. Simulation Manual

b. Simulation Setting booklet, one for each individual

c. Four phase booklets for each individual, one booklet for each phase

Equipment Needed

You will probably also need the following pieces of equipment to complete the simulation problems.

a. Pencil to work the problems

b. Scratch paper

c. Ruler or straight edge for diagrams required in some problems

d. Adding machine for aid in calculating budgets and other figures (helpful, but by no means necessary)

D. General Directions for Use

It is recommended that these simulation materials be used in conjunction with Module 2--Basic Principles and Techniques of Project Management of the Educational Project Management Instructional System (EPMIS). Nevertheless, it is possible to use the simulation by itself, referring to the Module 2 lessons if you find you need help in a particular area. Most of the instructions and references, however, are written with the assumption that you are taking (or have completed) Module 2.

As was noted previously, the simulation exercise is divided into four parts corresponding to the four major phases of project management. You may either proceed to work each phase after completing the corresponding phase in Module 2 or you may complete all lessons in Module 2 first and then proceed to work all the phases of the simulation. In either circumstance, the steps you will follow are essentially the same. These steps are listed below:

1. Read the Simulation Setting which is bound as a separate booklet. This will introduce you to the main characters and the general setting in which the remainder of the simulation operates.

2. Proceed to the Phase A simulation booklet and read the Overview, Objectives, Abstract, and directions. Then read carefully each document presented in the phase booklet, studying it for the facts it contributes to the tasks you must perform. The final document in each phase includes forms which you are to complete by using the various skills involved in project management. Fill out each form as instructed; you may refer back to the Simulation Setting manual or to documents in any previously completed phase for more information.

3. After completing the forms, return to this Simulation Manual and find the section at the back containing the Critiques and Checklists. These will enable you to evaluate the work you have just completed and prescribe any further instruction, if necessary.

4. After reviewing your answers for each phase, turn to the Phase Quality Control Form which begins on page M.40 of this manual. The answers you give to these questions will be used by the materials developers to improve the simulation. Your answers will not be identified in any way. At the completion of all four phases of the simulation, you will be asked to fill out a Simulation Quality Control Form that deals with the simulation as a whole. Send these completed forms to the address indicated on the forms.

5. Complete the Phase Quality Control Form, and continue to the next lesson or phase. If you have not completed all the lessons in Module 2, proceed to the next uncompleted lesson. If you have completed all the

lessons in Module 2, proceed to the next phase of the simulation; repeat steps 2, 3, and 4 for the remaining Phases B, C, and D of the simulation.

Throughout the simulation, you will be asked to play the role of Pat Beckley, a biology teacher at a middle school, who becomes the director of the project. You are asked to play the role of this character throughout the simulation. Make decisions and complete forms as though you were this character and were acting as the project director. Try to be as realistic as you can within the limitations of a written simulation such as this.

E. Suggestions for Group Use

This simulation is designed to be self-instructional. That is, an individual learner can complete the materials independently of anyone else. However, this simulation can also be used with a group of learners. If these materials are used in a group setting, it is suggested that the recommendations below are followed.

1. Equipment Needs

In addition to the materials listed previously, you may wish to obtain the following equipment for use during the simulation.

a. Chalkboard, chalk, and pointer

b. Overhead projector, transparent overlays, and grease pencils

c. Tables and chairs

2. Group Directions

The group leader should preferably be someone who has had previous experience participating in or leading a simulation. The group leader should do the following.

a. Obtain sufficient copies of the simulation materials to provide each learner with a copy of the setting booklet and each of the four phase booklets. Each learner should also be provided with a copy of the four checklists for evaluating performance in the simulation. It is not necessary to purchase additional copies of this Simulation Manual in order to do this, however; the checklist portions of this manual may be reproduced locally, if desired, provided appropriate credit is given. Only the group leader needs to have a copy of the complete Simulation Manual.

b. Give a copy of the Simulation Setting booklet and the Phase A booklet to each learner. If there are five people or fewer in the group they may work as a unit on the phase. If there are more than five people in the group, it is suggested that the group be divided into "teams" of from two to five people.

c. Let the teams read the booklets and work on the problems presented in the phase, coming up with one answer for the team as a whole. The team should act as though it were the individual (Pat Beckley) who is project manager of the simulation project.

d. After the teams have arrived at some satisfactory answers, bring the teams together again to discuss and compare answers. Give each learner a copy of the appropriate critique and checklist so the teams can evaluate their answers. The group leader should lead the discussion and comparison of answers.

e. Have each learner complete the Phase Quality Control Form for the phase just completed. In addition, at the completion of all four phases of the simulation, the Simulation Quality Control Form should also be filled out by each individual. These forms are part of the Critique and Checklist portion of this manual. At the conclusion of the simulation, these forms should be collected and sent to the address indicated on the forms.

f. In subsequent phases, the group leader should continue to follow these general procedures. The Critique and Checklist for a phase should be given to each learner after the phase has been completed and the teams are brought together for a discussion. Copies of these forms can be reproduced provided appropriate credit is given.

F. A Final Note

All the characters and places you will meet in the simulation are completely fictitious. However, the situation which you will read in Phase A is based closely on an actual proposal which was funded and successfully carried out. The proposal as presented here is not intended to be a "model" proposal. Certain parts of it have been rewritten in order to provide problems for the learner to deal with in the simulation. Nevertheless, some of the problems, and especially the situation described in Phase C--Controlling the Project, did actually occur during the course of this project. These have been retained so as to provide greater realism in the simulation.

Read the starting Instructions on page M.11

II. Simulation Instructions, Checklists and Quality Control Forms

A. Starting Instructions

Directions: Start the simulation by reading the Setting booklet and the Phase A booklet. Follow the further instructions which you receive there.

If you are completing this simulation in a group, follow the instructions of your group leader.

STOP! You may have gone too far!

This page indicates that you have completed Phase A of the simulation and are now ready to compare your answers with those of the Phase A Critique and Checklist.

This next section of the simulation manual contains the Critique and Checklists for the four phases. You should complete each phase before turning to the checklist for that phase.

B. Critique and Checklists for the Phases

Critiques and Checklists for the four phases appear in this section. After completing each phase of the simulation, compare your answers to the checklists to see if you have considered various points in your responses. If you feel that you did not achieve at the level you desired you might wish to review the lessons from EPMIS Module 2--Basic Principles and Tehcniques of Project Management which apply to that phase of the simulation.

Phase A--Planning the Project

Critique and Checklist

DO NOT TURN THE PAGE TO THIS SECTION UNTIL YOU HAVE COMPLETED THE PROBLEM EXERCISES IN PHASE A--PLANNING THE PROJECT ! !

Phase A--Planning the Project

Critique

The problems presented by the situation in Phase A are fairly typical of those found in many proposals written by people with only a nodding acquaintance with principles of project management. The Environmental Education Committee has discovered it has a problem with respect to the lack of good audio-visual aids for its new curriculum. Without much apparent investigation of alternative solutions, a decision has been made to attempt to remedy this problem by producing, on their own, a series of film loops and cassette tapes.

The proposal which Pat Beckley originally wrote up shows a number of misconceptions. It is basically a developmental proposal, not a research proposal, but he has still included a statement of problem section and a review of research section, as though writing a master's thesis. It is difficult to determine just what the purpose of the statement of objectives section is. The objectives given tend to be process-oriented, not product-oriented. That is, they tend to state how they will get to the final product, not what will be produced to contribute to the making of the final product. The description of activities is not related to any sort of a work breakdown structure. They are simply viewed as separate little steps without being placed in sets or subsets to contribute to overall missions. The PERT chart probably shows that Beckley has a nodding acquaintance with the notion but it has two major errors (Did you catch them when Madeleine Conners mentioned them in her memo?). First, you can tell just by looking at the chart for the work plan that the event from 0 to 3 ends on October 15, 1970 but the events from 3 to 4 and from 3 to 7 both begin on November 1, 1970 with no indication of what happened to the missing two weeks from October 15 to November 1. Furthermore, depending on how the chart is diagramed along a time scale, it is possible for event 3 to 4 to begin on October 15, even though its beginning is constrained by the end of event 0 to 1 which does not end until October 31.

Checklist

This checklist is divided into sections corresponding to the forms you completed in Phase A. For each statement, check at the left whether or not you have taken the action indicated.

1. PMO Form 1--Project Work Breakdown Structure
   - a. Divided the missions into smaller tasks.
   - b. Divided the tasks into smaller sub-tasks.
   - c. Presented the missions, tasks, and sub-tasks on a hierarchical basks.
   - d. Made each sub-task a clearly defined, specific accomplishment.
   - e. Avoided showing too much detail or making sub-tasks too small.
   - f. Avoided consideration of time sequence in determining the tasks and sub-tasks.
   - g. Checked to see that all work is covered by the sub-tasks.
   - h. Developed the sub-tasks in such a way that an individual can be assigned responsibility for each sub-task.
   - i. Insured that the work breakdown structure is consistent with the project proposal.
2. PMO Form 2--Project Work Flow Chart
   - a. Stated explicitly the nature of an activity or event by including an active verb, adjective, and noun (e.g., develop tryout questionnaire).
   - b. Represented activities by solid arrows.

c. Labeled events with words that indicate the start or completion of work (e.g., begin, end, start, complete, etc.).

d. Insured that no event begins until every event and activity preceding it has been accomplished.

e. Insured that each event or activity in the network appears only once.

f. Checked the network to remove any loops that might exist.

g. Checked to see what activities can go on at the same time that others are going on.

h. Numbered the activities or events so they can be properly identified.

i. Designated the time units in which the chart is written (days, weeks, etc.).

j. Estimated times based on the nature of the task and an effective resource application rate.

k. Identified the critical path as the most time-consuming series of events or activities.

l. Insured that the tryout phase of the project activities do not occur after school lets out in June.

m. Conducted some activities concurrently (in parallel with others) in order to save time.

3. PMO Form 3--Task-Event-Resource Estimation Calendar

a. Considered different or conflicting demands on the same resource.

b. Adjusted the activity time estimations when necessary.

c. Designated the personnel needed for each of the activities.

d. Designated equipment needed for each of the activities.

e. Coordinated activity times and resources to avoid overlap of resources needs.

f. Moved activities on non-critical paths until resources are available.

g. Adjusted needed resource skills to insure an even rate of application.

h. Considered directed or known schedule dates (such as the end of the school year) in discussing the schedule.

4. PMO Form 4--Project Budget

a. Estimated the personnel, materials, services, travel and other direct costs needed for each mission.

b. Used the task-event-resource calendar as the basis for estimating costs.

c. Provided an adequate justification or explanation for line items.

d. Figured the totals for the project by adding the figures for the three missions.

Prescription for further learning

You will have to be your own judge regarding the adequacy of your responses on the forms in this phase. If you find your answers on one particular form are weaker than on others, you will certainly want to get more training in that particular area. There are three basic ways in which you can get more training in skills of project management.

First, if you do not already have a copy of Module 2--Basic Principles and Techniques of Project Management, it would be wise to get one, and study the sections in it in which you feel weakest. Module 2 is designed to be used in conjunction with this simulation and is part of the Educational Project Management Instructional System developed by Research for Better Schools, Inc. It can be obtained from the same source from which you got this simulation.

Second, if you already have Module 2 and are using it with this simulation, you might wish to return to the appropriate sections of it and review some of the lessons there. Phase A is designed to utilize information presented in Lessons Two through Six of Module 2; review these lessons.

Third, obtain a copy of Educational Project Management by Desmond L. Cook (Columbus, Ohio: Charles Merrill Publishers, 1971) and read the chapters in it which are applicable to problems in this phase. Chapters Five through Nine in the book deal with skills in project planning.

Directions: When you have completed evaluating your answers to Phase A, do one of the following:

1. *If you are working through this simulation by yourself, turn to page M.40 of the Simulation Manual, and complete the Phase Quality Control Form for this phase.*
2. *If you are working through this simulation as a member of a team, follow your group leader's instructions for completing the Phase Quality Control Form.*

Phase B--Preparing the Project

Critique and Checklist

DO NOT TURN THE PAGE TO THIS SECTION UNTIL YOU HAVE COMPLETED THE PROBLEM EXERCISES IN PHASE B--PREPARING THE PROJECT ! !

Phase B--Preparing the Project

Critique and Checklist

Critique

Phase B is basically concerned with matters of project organization and setting up some sort of project information system. The original proposal has been rewritten somewhat and now has a better set of objectives, an improved flow chart, and a more detailed budget. But the review of research section is still there and, as we shall see later in Phase C, there are other flaws in the cost estimate.

With the funding of the project, it is now necessary to consider how it will be organized, the equipment to be obtained, and how information on the project's progress will be provided. You will notice at this point that the Armitage School System, like most school systems, does not have a formal project initiation system but rather an informal one supported by the forms which Madeleine Conners sends out. The management responsibility guide may appear perhaps a bit complex for a project as simple as this but it is a valuable item to fill out regardless of how small is the project.

Checklist

This checklist is divided into sections corresponding to several forms used in Phase B. For each statement, check at the left whether or not you gave consideration to this point in completing the form.

1. PMO Form 16--Position Description

   a. Based the duties and responsibilities of the position on the work breakdown structure.

   b. Indicated the amount of time which the person will spend on the project.

c. Given an accurate and brief description of the actual work which will be required of the person.

d. Indicated the essential minimum requirements and qualifications for the position.

e. Indicated the desirable, but not essential, requirements and qualifications for the position.

f. Indicated salary to be paid.

2. PMO Form 23--Equipment and Facilities Needs

a. Considered in determining office requirements such factors:

(1) Availability of school-owned space, especially within school.
(2) Space needed for staff work area to contain desks, etc.
(3) Space needed for preparation of materials, tapes, etc.
(4) Storage space for equipment, cameras, etc.

b. Considered including such items as the following in the request for office equipment:

(1) Desks
(2) Chairs
(3) Filing cabinets
(4) Typewriters
(5) Storage cabinets
(6) Typing tables
(7) Work tables
(8) Desk lamps

c. Included other items of equipment such as the following:

(1) Cassette recorders from the school audio-visual supplies
(2) Projection screens
(3) Film loop projectors
(4) Splicing equipment
(5) Editing equipment
(6) Camera(s)
(7) Motion picture title-making sets

d. Allowed for adequate lead time in order to procure such equipment.

3. PMO Form 15--Organization Chart

a. Shown each of the prospective positions to be filled by the project staff.

b. Drawn the chart so as to show channels for the flow of information as well as authority and responsibility.

c. Developed the chart in a hierarchical format.

d. Listed the duties of various positions in the project.

4. PMO Form 7--Management Responsibility Guide

In completing the Management Responsibility Guide, you should have:

a. Accurately described the tasks of the work flow.

b. Included all tasks from the work flow.

c. Labeled each task with its event numbers from the flow chart.

d. Carefully examined each staff member's relation to each task.

e. Assigned proper responsibility codes for each task to the appropriate members.

f. Not have tried to assign every member a role in every task.

g. Assigned more than one responsibility to an individual for a given task where necessary.

h. Not have assigned any conflicting combination of responsibilities to an individual according to the MRG instructions.

i. Examined the chart to insure there are no conflicts between members' responsibilities for a task.

j. Drawn the guide so it can be used to resolve and identify accountability interface problems.

k. Avoided duplications, gaps, or ambiguities in assigning responsibilities.

l. Clarified respective roles and relationships.

5. PMO Form 4--Major Milestone Summary

In describing the major milestones on PMO Form 4, you should have:

a. Associated each milestone with a significant point of accomplishment in the project.

b. Associated each milestone with a major work package.

c. Noted a completion date that is in accordance with the time estimates given on the flow chart.

d. Indicated if a report is to be made at the accomplishment of the milestone.

e. Found at least three milestones in the project in this simulation.

6. PMO Form 24--Project Reporting System

In designing the reports which will occur in the project, you should have:

a. Indicated the type of report to be made (oral, written, etc.).

b. Given an idea of the nature of the report in its title (schedule, financial, etc.).

c. Associated the report with major milestone events or activities.

d. Given some idea of the date the report will be made.

e. Noted the format of the report.

f. Named the persons to whom the report will be sent.

g. Indicated why these persons will be sent the report.

Prescription for further learning

You will have to be your own judge regarding the adequacy of your responses on the forms in this phase. If you find your answers on one particular form are weaker than on others, you will certainly want to get more training in that particular area. There are three basic ways in which you can get more training in skills of project management.

First, if you do not already have a copy of EPMIS Module 2--Basic Principles and Techniques of Project Management, it would be wise to get one and study the sections in it which deal with the skills in which you feel you need help. Module 2 is designed to be used in conjunction with this simulation and is part of the Educational Project Management Instructional System developed by Research for Better Schools, Inc. It can be obtained from the same source from which you got this simulation.

Second, if you already have Module 2 and are using it with this simulation, you might wish to return to the appropriate sections of it and review some of the lessons there. Phase B is designed to utilize information presented in Lessons 7 and 8 of Module 2; review these lessons.

Third, obtain a copy of Educational Project Management by Desmond L. Cook (Columbus, Ohio: Charles Merrill Publishers, 1971) and read the chapters in it which are applicable to problems in this phase. Chapters 3 and 10 in the book deal with skills in project preparation.

Directions: When you have completed evaluating your answers to Phase B, do one of the following:

1. *If you are working through this simulation by yourself, turn to page M.40 of the Simulation Manual, and complete the Phase Quality Control Form for this phase.*
2. *If you are working through this simulation as a member of a team, follow your group leader's instructions for completing the Phase Quality Control Form.*

Phase C

Controlling the Project

Critique and Checklist

DO NOT TURN THE PAGE TO THIS SECTION UNTIL YOU HAVE COMPLETED THE PROBLEM EXERCISES TO PHASE C--CONTROLLING THE PROJECT ! !

Phase C--Controlling the Project

Critique and Checklist

Critique

Phase C presents us with two problems, one of which is so completely unexpected and potentially disastrous that it must be solved or the project will fail. Things seem to have gotten underway fairly smoothly. The literature search has been done; topics for the film loops have been identified; some film has been taken; and the project personnel (except for the unhired graduate student assistant) are working efficiently. Then two problems hit: one a small one from the project's typist, and the other a bombshell in the form of the letter from Mr. Melvin Hobbs.

In working through this section, you should have had no trouble in determining that the budget problem was the really big one requiring the most immediate attention. The absent secretary, while not an insignificant problem, is one that could have been handled by any number of satisfactory means.

The reactions of Pat Beckley and Warner Adams to this serious budget problem are fairly typical of persons not sophisticated in management techniques. First, Beckley jumps to a conclusion as to the cause of the problem (the high costs of editing the films) with no indication as to what evidence he has for this, if any. Adams then jumps to more conclusions regarding the possible solutions to the problem. Adams wants to rule out all professional services. These conclusions may be either right or wrong. The point is that neither has used proper management to analyze the problem, find the causes, consider a series of alternative solutions, and weigh each to pick the best one.

It is extremely difficult to evaluate your responses to Phase C. There are many different but acceptable solutions to this problem. The solution you picked depends on what you selected as the cause of the problem and the alternative solutions you devised. Since this is a simulation, it is not possible to let time and the eventual project results be the test of your solution. However, as was noted in the simulation manual, this project is based loosely on a real project. The problem presented here actually happened in the course of that project. The original project was attempting to produce film loops and cassette tapes and had budgeted about $3,000 for film cartridge production. After receiving a bill for $2,000 for three cartridge films and two copies of each film, alterations had to be made in the project. These changes may not have been the best that could have been made, but the project did finish up successfully on schedule and within budget. You might want to compare your solution with the one that was actually tried.

In the original project, the decision was made to make the remainder of the films directly on 8 mm film. A graduate student, with some experience in filming, was added to the staff to make the films and a tripod was purchased and a camera located.

Two approaches to the problem were tried. The first approach to film production was that of the "trial film" in which a trial film is made on 8 mm film and additional footage is shot to provide a film which is then reviewed and used as the basis of a script. It was soon discovered that this procedure wasted film and time, as well as requiring a second visitation of the filming site.

In the second approach, the project hired a professional script writer (similar to the one already on the staff of the simulation project) and scripts carefully prepared and timed before filming was attempted. The cameraman, script writer, and the staff member who performed the original research cooperated to set up a filming schedule. This approach was highly effective and the project was completed utilizing carefully prepared and timed scripts as the basis for making 8 mm films. Each scene in the film was exactly timed, precisely described as to long shot, medium shot, and content. The credits were filmed first, then each scene exactly as in the script. All that was needed was to have the film developed, duplicated, and dropped into a cartridge.

Checklist

The checklist below is arranged in two sections, one for the memo about the problem summary statement which you sent to Warner Adams, and the other for the PMO Form 50 Change Memorandum Summary which you sent to Madeleine Conners. Each section is further subdivided in the paragraphs in each form. Regardless of the exact nature of the solution you developed, you should have included most of the following aspects and principles in the two items. For each statement, check at the left whether or not you gave consideration to this point in your answer.

1. Memo to Warner Adams, Subject: Problem Summary Statement

   a. Paragraph A: Problem Statement

      (1) Identified the specific problem in a clear statement.
      (2) Identified the most important problem as the cost of producing the film loops by the present process is beyond the budgeted amount.
      (3) Shown evidence of thinking through the production process.

(4) Suggested several possible causes of the problem.
(5) Included the possibility of high editing costs as one of the possible causes.
(6) Used a process of elimination to attempt to eliminate all untrue causes.
(7) Shown a method of getting more information.
(8) Indicated the possibility of getting more information from Hobbs Film Studio and the photographer.
(9) Identified any one of the proposed causes as the true one.
(10) Stated this cause explicitly.
(11) Indicated quantity and arrangements of resources for dealing with stated problems (money, personnel, etc.).

b. Paragraph B: Objective

(1) Given consideration to the impact of the problem on the project as a part of the process of deriving objective(s).
(2) Indicated potential failure of the project in deriving objectives.
(3) Identified corrective or adaptive action that is to take place.
(4) Stated goal that is to be achieved in problem solution.
(5) Indicated criteria for selecting the most desirable alternative.
(6) Indicated method for selecting alternative.
(7) Stated need objectives clearly.
(8) Stated like objectives clearly.

c. Paragraph C: Alternatives

(1) Described the major alternatives you devised for dealing with the problem.
(2) Indicated several potential solutions (at least three).
(3) Examined each for its conformance with need objectives
(4) Determined how well each satisfies the like objectives.
(5) Indicated at least one advantage and one disadvantage for each potential solution.
(6) Clearly shown the reason for rejecting a solution (if it was rejected).

d. Paragraph D: Action

(1) Stated clearly the course of action which you chose to solve the problem.
(2) Shown why you chose that particular course of action.
(3) Identified potential desirable and undesirable consequences of implementing the selected alternative.
(4) Indicated the probability that these consequences may occur.

2. PMO Form 50--Change Memorandum Summary

For the form as a whole, the student should have:

a. Indicated the changes that should cause the selected alternative course of action to be implemented.

b. Discussed the change consistently across sections (i.e., if a change is indicated in one section which requires a change in another section, this should be so indicated).

Section A: Problem Description

a. Summarized the Problem Summary Statement

b. Clearly stated a proposed course of action

Section B: Changes to objectives, work activities, and standards

a. Listed any change to project objectives.

b. Listed any change to work activities.

c. Listed any change to performance standards.

d. Stated all the above in such a way as to help implement the decision.

Sections C through G: For each section

a. Indicated modifications necessary in work sequence due to changes listed in Section B.

b. Listed any other changes needed to implement the decision.

Section H: Potential problems

a. Identified potential problems in implementing decision made.

b. Used information about consequences of various alternatives from the Problem Summary Statement to help identify problems.

c. Described contingency plans that have been developed in case potential problems occur.

Section I: Distribution

a. Listed all staff and administrators who are to receive copies of the change memorandum.

b. Included in the list all persons affected by the change.

Prescription for further learning

You will have to be your own judge regarding the adequacy of your responses on the forms in this phase. If you find your answers on one particular form are weaker than on others, you will certainly want to get more training in that particular area. There are three basic ways in which you can get more training in skills of project management.

First, if you do not already have a copy of EPMIS Module 2--Basic Principles and Techniques of Project Management, it would be wise to get one, and study the sections in it in which you feel weakest. Module 2 is designed to be used in conjunction with this simulation and is part of the Educational Project Management Instructional System developed by Research for Better Schools, Inc. It can be obtained from the same source from which you got this simulation.

Second, if you already have EPMIS Module 2 and are using it with this simulation, you might wish to return to the appropriate sections of it and review some of the lessons there. Phase C is designed to utilize information presented in Lessons 9, 10, and 11 of Module 2; review these lessons.

Third, obtain a copy of Educational Project Management by Desmond L Cook (Columbus, Ohio: Charles Merrill Publishers, 1971) and read the chapters in it which are applicable to problems in this phase. Chapters 10 and 11 in the book deal with skills in project control.

Directions: When you have completed evaluating your answers to Phase C, do one of the following:

1. If you are working through this simulation by yourself, turn to page M.40 of the Simulation Manual, and complete the Phase Quality Control Form for this phase.

2. If you are working through this simulation as a member of a team, follow your group leader's instructions for completing the Phase Quality Control Form.

Phase D

Terminating the Project

Critique and Checklist

DO NOT TURN THE PAGE TO THIS SECTION UNTIL YOU HAVE COMPLETED THE PROBLEM EXERCISES TO PHASE D--TERMINATING THE PROJECT ! !

Phase D--Terminating the Project

Critique and Checklist

Critique

The problems which Pat Beckley faces in the termination phase of this project are typical of those encountered by project managers. Someone who works on the project is concerned with his re-employment, someone else is trying to get his hands on the products which the project has produced, and there are dozens of details to be taken care of, not the least of which is the final report.

The form for outlining the termination plan is purposely presented first here. The responses which Beckley makes on the two memos which follow should grow out of information contained in the termination plan. Beckley should have had a termination plan made up previously. Whether he did or not, however, the terms of employment should have been made clearer to Hosea Turner when he was hired for the project. Most probably he will not be rehired. However, if you were clever, you might recall from Phase C that Charles Greymont was interested in duplicating the films and distributing them around the state. This could suggest a second project to further test, refine, and revise the film loop packages and this might involve re-employing such people as Turner.

Mrs. Speiss, on the other hand, is obviously (and understandably) interested in obtaining copies of the film loop-cassette tape packages for the school system. Usually, the contract is written to carefully specify the ownership of any products produced by the project. The funding agency is normally the one which "owns" the products but the project director is usually allowed to retain a number of copies for distribution as he sees fit.

The project history has been placed last in this simulation to provide you with a way of reviewing the overall conduct of the project. A frank and open review session with your project staff in which you discuss what was done well and what might have been done better is always a good idea in any project. A written record should be kept of these experiences and recommendations for use in later projects.

Checklist

The checklist below is arranged in the order in which the documents appear in the simulation problem exercise. Check at the left whether you have taken the actions indicated for correctly completing each item.

1. PMO Form 67--Project Termination Plan

   a. Indicated throughout the form whether the project is to be ended with this effort or continued into another project.

   b. If the project is to be ended, noted any changes (if any) in the anticipated ending date.

   Section A: Equipment and Facilities

   a. Arranged for disposition of equipment items.

   b. Included all items previously requested from the school system.

   c. Indicated disposition of all items acquired specifically for the project by purchase or rent.

   d. Settled any outstanding bills for purchase or rental of equipment or for any other services.

   Section B: Personnel

   a. Informed personnel of the details of the termination plan.

   b. Informed each person of details of his future employment.

   c. Insured that all pay has been, or will be, made to personnel.

Section C: Products

a. Insured that final products were all produced to specification.

b. Made certain that copies of final products to be sent to funding agency were sent so as to arrive in good and sound condition.

c. Arranged (if permitted) to retain a number of copies for local school system use.

Section D: Final Report

a. Insured that an adequate number of copies of the report were printed.

b. Indicated the persons who are to receive copies of the report.

c. Shown a coherent organized outline for the content of the report.

d. Included in the final report such items as the following:

(1) A brief review of the project proposal
(2) Necessary information regarding funding, control, etc.
(3) Objectives of the project.
(4) Procedures used in accomplishing the objectives
(5) Problems encountered in the operation of the project
(6) Data from the work (man-hours, number of items produced, unit cost, etc.)
(7) Data from the evaluation and tryout (test scores, opinion surveys, etc.)
(8) Recommendations for further research or development
(9) Observations by staff members on filming techniques, etc.
(10) Sample scripts, booklets, filming schedules, etc.
(11) Description of equipment
(12) Listed names of personnel involved
(13) Described all film-loop packages produced

2. Memo to Hosea Turner, Subject: Continuation of Employment

a. Indicated the original provisions of the employment agreement.

b. Indicated if efforts are being made to continue this work on another project.

c. Clearly stated the ending date of his employment.

d. Offered to help him find new employment.

e. Exhibited friendliness, tack, and concern for the employee.

f. Thanked him for his efforts on the project.

3. Memo to Angela Spiess, Subject: Planned disposition of environmental education film loops

   a. Stated original provisions of ownership of film loop packages as stated in contract.

   b. Indicated number of copies of film loop packages which will be retained locally.

   c. Indicated desired disposition of film loop packages to be retained.

   d. Indicated when packages will become available.

   e. Noted any limitations on the use of the film loop packages (due to copyright or other factors).

   f. Designated disposition of borrowed equipment mentioned in the memo.

4. PMO Form 68--Project History and Review

   a. Derived comments from all staff members.

   b. Noted all major problems encountered.

   c. Indicated how such problems were analyzed and the solution which was eventually chosen.

   d. Described the success of such solutions.

   e. Made recommendatins as to how these problems might have been better solved.

   f. Examined all aspects of the project to see what might have been handled better, such as:

      (1) Writing the original proposal
      (2) Setting up a project management information system
      (3) Making better cost estimates
      (4) Anticipating potential problems before they occur
      (5) Handling personnel problems
      (6) Utilizing project management techniques

   g. Made recommendations for future project managers.

Prescription for further learning

You will have to be your own judge regarding the adequacy of your responses on the forms in this phase. If you find your answers on one particular form are weaker than on others, you will certainly want to get more training in that particular area. There are three basic ways in which you can get more training in skills of project management.

First, if you do not already have a copy of EPMIS Module 2--Basic Principles and Techniques of Project Management, it would be wise to get one, and study the sections in it in which you feel weakest. Module 2 is designed to be used in conjunction with this simulation and is part of the Educational Project Management Instructional System developed by Research for Better Schools, Inc. It can be obtained from the same source from which you got this simulation.

Second, if you already have EPMIS Module 2 and are using it with this simulation, you might wish to return to the appropriate sections of it and review some of the lessons there. Phase D is designed to utilize information presented in Lesson 12 of Module 2; review these lessons.

Third, obtain a copy of Educational Project Management by Desmond L. Cook (Columbus, Ohio: Charles Merrill Publishers, 1971) and read the chapters in it which are applicable to problems in this phase. Chapter 12 in the book deals with skills in project termination.

Directions: When you have completed evaluating your answers to Phase D, do one of the following:

1. If you are working through this simulation by yourself, turn to page M.40 of the Simulation Manual, and complete the Phase Quality Control Form for this phase.

2. If you are working through this simulation as a member of a team, follow your group leader's instructions for completing the Phase Quality Control Form.

C. Phase Quality Control Form

Fill in the last four digits of your Social Security Number ________________

Directions: Under the appropriate column at the right, circle the response that corresponds with your answer for each question for the phase you have just completed. You need not confine your written comments to Question 12; feel free to write comments next to each question.

After completing the response columns for Phases A, B, and C, turn to the instructions on page M.46 of the Simulation Manual.

After completing the response column for Phase D, turn to the Simulation Quality Control Form on page M.44 of the Simulation Manual.

No.	Questions	Responses Phase A	 Phase B	 Phase C	 Phase D
1.	Was the general problem or task description clear and understandable? a. Very understandable b. Moderately understandable c. Somewhat understandable d. Not understandable	a b c d	a b c d	a b c d	a b c d
2.	Were the directions for completing the forms clear and understandable? a. Very understandable b. Moderately understandable c. Somewhat understandable d. Not understandable	a b c d	a b c d	a b c d	a b c d
3.	Was enough work space provided on the forms? a. Very much so b. For the most part c. Barely enough d. Not enough	a b c d	a b c d	a b c d	a b c d

Fill in the last four digits of your Social Security Number ____________.

No.	Questions	Responses			
		Phase A	Phase B	Phase C	Phase D
4.	Was the Critique and Checklist helpful in evaluating your work? a. Helped a lot b. Helped a moderate amount c. Helped some d. Not helpful	a b c d	a b c d	a b c d	a b c d
5.	Was enough information supplied in the documents in the phase to enable you to complete the tasks of the phase? a. Very much so b. For the most part c. Barely enough d. Not enough	a b c d	a b c d	a b c d	a b c d
6.	Did the tasks you performed in the phase seem relevant to project management in a public school setting? a. Very relevant b. Moderately relevant c. Somewhat relevant d. Irrelevant	a b c d	a b c d	a b c d	a b c d
7.	Was the phase too long and involved? a. Much too long b. A little too long c. About right d. Too short	a b c d	a b c d	a b c d	a b c d
8.	Was the working of this phase beneficial to you? a. Very beneficial b. Moderately beneficial c. Somewhat beneficial d. Not beneficial	a b c d	a b c d	a b c d	a b c d

Simulation Manual

Fill in the last four digits of your Social Security Number ____________

No.	Questions	Phase A	Phase B	Phase C	Phase D
9.	Did the experience you gained from doing the practice exercises in the lessons of the Basic Principles and Techniques of Project Management Module help you to better perform the tasks of this Phase? (Skip this question and question 10 if you are not using the Module with the simulation.) a. Helped a lot b. Helped a moderate amount c. Helped some d. Not helpful	a b c d	a b c d	a b c d	a b c d
10.	Did the lesson or lessons of the Basic Principles and Techniques of Project Management Module provide you with enough knowledge to enable you to work the tasks of this phase? a. Very much so b. For the most part c. Barely enough d. Not enough	a b c d	a b c d	a b c d	a b c d

11. List any suggestions you might have for the revision and improvement of the simulation phases.

Phase A. ____

____

____

Phase B. ____

____

____

Fill in the last four digits of your Social Security Number ____________

Phase C. ____

____

____

Phase D. ____

____

____

A REMINDER: After finishing the response columns for Phases A, B, and C, turn to the instructions on page M.46 of the Simulation Manual.

After completing the response column for Phase D, turn to the Simulation Quality Control Form on page M.44 of the Simulation Manual.

Simulation Quality Control Form

Fill in the last four digits of your Social Security Number ____________

Directions: Circle at the right the response which corresponds to your answer to each question. Please feel free to write in any comments which would clarify your answer beneath each question. You need not confine written comments to the open-ended questions.

No.	Question	Responses
1.	Does the description of the school setting in the Simulation Setting seem realistic? a. Very realistic b. Moderately realistic c. Somewhat realistic d. Unrealistic	a b c d
2.	Does the Simulation Setting contain too much information? a. Yes, far too much b. Yes, a little too much c. No, about right d. No, not enough	a b c d
3.	Does the project description in Phase A seem realistic? a. Very realistic b. Moderately realistic c. Somewhat realistic d. Unrealistic	a b c d
4.	Does the project description in Phase A contain too much information? a. Yes, far too much b. Yes, a little too much c. No, about right d. No, not enough	a b c d
5.	Overall, how well did this simulation meet your expectations? a. Very well b. Fairly well c. Slightly below expectations d. Well below expectations	a b c d

Fill in the last four digits of your Social Security Number ________

No.	Questions	Responses
6.	In what specific ways did this simulation not meet your expectations?	
7.	In what specific ways did this simulation benefit you?	

When you have completed the Simulation Quality Control Form, turn to the Termination Instructions on page M.47 of this manual.

Follow the instructions there for sending in these forms.

Continuation Instructions

Directions: At this point, you should have completed the Phase Quality Control Form for either Phase A, B, or C.

If you are performing each phase of the simulation as you complete each of the four major phases of the EPMIS Module 2--Basic Principles and Techniques of Project Management, you should now proceed to the next lesson in one of the following ways:

1. If you are working through the simulation and lessons by yourself, obtain a copy of the booklet for the next Module 2 lesson and proceed to follow the instructions there.

2. If you are working through the simulation and lessons as a member of a group, follow your group leader's instructions.

If you are utilizing the EPMIS Module 2 in conjunction with this simulation but have completed all the lessons and are working through each phase of the simulation in succession, you are now to proceed to the next phase by one of the following methods:

1. If you are working through the simulation by yourself, obtain a copy of the next phase booklet and follow the instructions there.

2. If you are working through the simulation as a member of a group, follow your group leader's instructions.

If you are using the simulation by itself, and not using the EPMIS Module 2, you are now to proceed to the next phase of the simulation by one of the following methods:

1. If you are working through the simulation by yourself, obtain a copy of the booklet for the next phase, and proceed to work through that phase.

2. If you are working through the simulation as a member of a group, follow your group leader's instructions.

Educational Project Management Instructional System

Simulation Setting

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
Suite 1700, 1700 Market Street
Philadelphia, Pennsylvania 19103

May 1973

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Preface to Simulation Setting

On the following pages is the setting for the case simulation. It presents the general setting in which the rest of the simulation is based and includes an introduction to the city and school system where these events happen. Most importantly, it introduces you to the main characters of the simulation, people whom you will meet again in the course of managing the simulated project. It also sets up the basic problem which the project proposal is designed to remedy.

The characters in this simulation setting and the locations and names involved are entirely fictional and no resemblance to real persons or places is intended.

The simulation setting is designed to be read before reading any of the information in the Phase A booklet. Feel free to refer back to the simulation setting for any information you may need in completing any of the phases in the simulation.

THE SIMULATION SETTING:
THE CITY OF
ARMITAGE, NEW HOPEWELL

The city of Armitage has a population of about 150,000 and is centrally located in Allen County in the state of New Hopewell. Armitage is a pleasant town to live in, as most of its inhabitants agree. It is located on the Miskatonic River and is bounded for a short distance by marshlands whose water comes from that river; the remainder of the land around Armitage is farmland which fades into forests toward the north of the city. The city's growth patterns have been fairly stable for some years; the only major annexations have occurred at the northern boundary of the city not far from the marshlands.

The Business of Armitage

Armitage has a fair degree of heavy industry. Among the important industries are a division of a large auto company which makes rubber and metal parts for that company's cars; a millworks which makes construction materials and a paper box manufacturer both of which draw their wood supplies from foresting operations in the northern part of the state; a foundry which casts special order cast iron products for sewer pipes, manhole covers, and other items. There are also a number of service industries such as printing, tool and die work, etc.

The Schools of Armitage

The Armitage City School System has about 25,000 students with about another 5,000 enrolled in private and parochial schools. About 25 per cent of these school children are black and 70 per cent are white.

About five per cent of the children are of American Indian ancestry, the last traces of the Miskatonic Indian tribe which once owned the local lands.

A private, primarily liberal arts college of about 5,000 students is also located in the town. It is called Miskatonic University after the river which bounds one side of its property. Originally founded by missionaries, it now has dropped its religious affiliation. It offers a number of four-year degrees and a few master's degrees in English, fine arts, biology, and education. The University also owns part of the surrounding marshlands which it keeps as a biological study area.

The superintendent of the Armitage City School System, Dr. Stephen Ford, came to the school system about three years ago after a successful stint as superintendent of a smaller system of about 10,000 students in a neighboring state. He is a most progressive man and is anxious to keep his school system abreast of innovations. His hard-headed economic sense in getting the most productive efforts possible for the money expended is a good thing since, like many school systems, Armitage has been suffering from money problems. There has been some conservative opposition to his policy of innovation, both in the community and on the five-member school board, but his management skills and his persuasive manner have helped to build a majority who support (or at least tolerate) his policies.

Many of the innovative ideas that have been attempted have been the brainchild of Dr. Warner Adams, a brilliant and energetic young man whom Ford installed as Assistant Superintendent of Curriculum shortly after his (Ford's) arrival in Armitage. Adams has been largely responsible for devising many of the innovations presently being tried. He has been most receptive to teachers' ideas for change and has endeavored to bring original approaches to increasing the effectiveness of instruction. He is generally respected, though some teachers mistrust his efforts. It must be admitted that his efforts are sometimes a bit too broad in scope. Ford, however, has been a good influence on him and has helped to keep his projects within the realm of economy and practicality.

The Project Management Office (PMO)

Two of Ford's innovations are of concern to us here. The first of these is the Project Management Office which Ford established to provide competent management skills and advice for projects within the school system. A description of the PMO (from its current recruiting literature) includes these comments:

> The Project Management Office is a group of experienced project managers and management consultants attached to the superintendent's office and reporting, through the office director, to the superintendent. Its main function is to assist various school agencies in the development, planning and implementation of various programs and projects. Many, though not all, of these are of a high priority, or involve large expenditures, or may require coordination of a number of agencies, both within and outside the school system.

The Director of the Project Management Office is Madeleine Connors who has had considerable training in project management techniques, PERT, PPBS, and so on. She had some experience in business helping to manage projects related to the production of equipment for the Navy before she turned to the field of education. She has been with the school system for about two years and, with the aid of the staff she has recruited, has helped to increase the efficiency of the many projects which the school system has undertaken. Although the PMO is technically part of the organization of the Assistant Superintendent for Planning, in practice, it reports to the Superintendent whose influence was often called upon to grease bureaucratic wheels.

One important act of the PMO has been to increase the school system's contact with Miskatonic University. It has drawn on the talents and training of a number of faculty members at the University for help and advice on a number of projects. This source of technical expertise has helped the PMO to plan projects more efficiently; and to put teachers and administrators who have projects and ideas in touch with faculty who can advise them on means of carrying these out. It has also increased the hiring of graduate students from the University for help on various projects, a step which provides the school system with a source of well-trained manpower for use on projects and gives the students valuable internship experiences.

The Armitage Middle Schools

Another important innovation is the construction of two middle schools for about one-third of the city's sixth, seventh, and eighth graders. Shortly after Ford's arrival, it became apparent that the school system would have to increase its physical plant to cope with increasing enrollments. Although it took a while to sell the idea, the school board, at Warner Adams' urging, decided that, rather than build another elementary school or add on to a high school, two middle schools would be built to handle some of the increase. It was also agreed that the middle schools would be built to accommodate, over a period of time, a number of innovations such as team teaching, a flexible daily schedule, a non-graded structure, and others.

The two middle schools that were eventually built were called Wayson Middle School and Lane Middle School. Each was designed to enroll 600 students at the maximum, but at the moment they have only about 400 each. Both the schools were built on an "open-space" concept without the conventional egg-crate classrooms or the usual interior walls. They were both hexagonal structures with various functional areas. A crude sketch of Wayson Middle School's layout, which is fairly typical of both schools although there were some minor differences between the two, is presented as Figure 1. Although the schools are completely carpeted and air-conditioned, the lack of interior walls cut the total cost of the buildings to about two-thirds that of conventional structures.

The schools' faculties are composed almost entirely of volunteers who are organized in teaching teams of about five members each by general subject area. Each school has a science team, a social studies team, a math team, and an English team. In addition, a few specialized subjects like music, art, and foreign languages utilize one teacher who travels between both schools. Each team can handle about 100 students at a time, in a variety of ways depending on what is to be taught at any particular time. All 100 students can be divided into groups of 15 to 30 members each for specialized instruction or help in a certain topic; or into very small groups of about five to ten students each for help with special problems or for supervision in conducting individual or group projects.

The schools do not have a conventional rigid daily time schedule; rather, the teams coordinate their instruction with each other so that students have a flexible schedule with varying amounts of time spent in certain subjects on different days. An important consequence of this

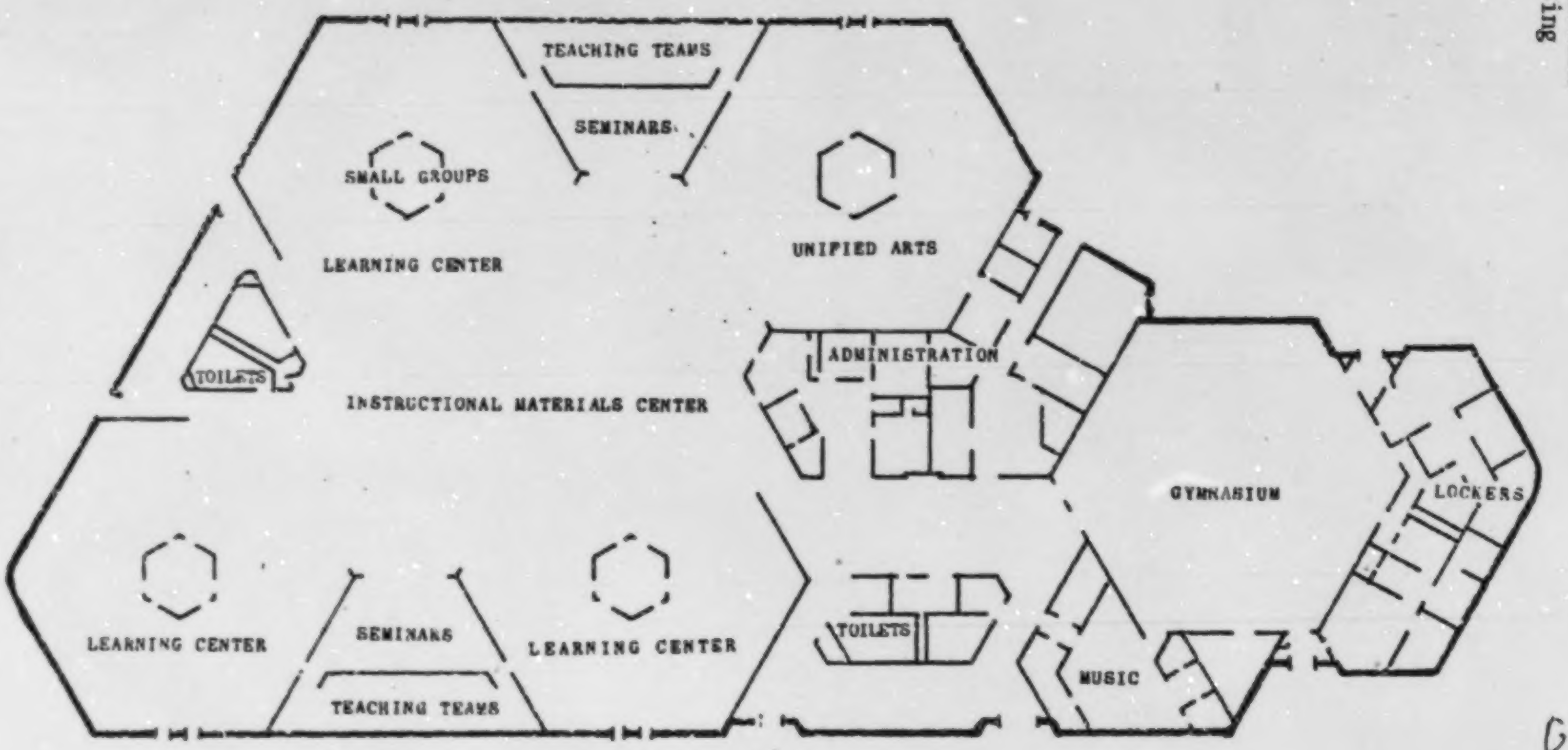
TEACHING TEAMS
SEMINARS
SMALL GROUPS
UNIFIED ARTS
LEARNING CENTER
TOILETS
ADMINISTRATION
INSTRUCTIONAL MATERIALS CENTER
GYMNASIUM
LOCKERS
LEARNING CENTER
SEMINARS
LEARNING CENTER
TOILETS
MUSIC
TEACHING TEAMS

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Figure 1. Wayson Middle School Floor Plan

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form of scheduling is that students have segments of each day during which time they have no formal class. At these times, students are assigned to study carrels in the Instructional Materials Center for independent study on topics of interest to them or for work on assigned projects. The carrels are equipped with electrical outlets so students may use cartridge-type film loops, cassette tape players, film strip projectors, teaching machines, and so on.

There have been difficulties in putting this idea into practice. Students have not always adjusted adequately to the responsibility of independent study. Further, to make the situation worse, there has been a lack of funds for stocking the independent study area with books, tapes, filmstrips, etc. Although there is a librarian assigned to the Instructional Materials Center to maintain the collection of learning materials, much of her time is spent in supervising the students and teaching them how to handle the equipment. Teachers have also complained of a lack of audio-visual software (tapes, films, film loops, etc.) of an acceptable quality which relate to the concepts they are trying to teach.

The Environmental Education Program

This lack of suitable audio-visual software has recently become a very apparent problem in the efforts of the school to present instruction in environmental education. The social studies team and the science team at both middle schools have been working together to devise a course of study in environmental education. The English teams have been cooperating with this effort by having students write essays and various other assignments on the topic in coordination with the course of study devised by the committee. During the previous school year, a committee of teachers from both middle schools drew up objectives and content for the curriculum; attempts were made during the latter half of the school year to put the curriculum into practice chiefly through large or small group lectures and discussion groups.

The teams tried to get the students very involved in the effort. Students were assigned to find examples of various kinds of threats to the environment and they came up with quite a few locally: air pollution from the foundry and the rubber parts manufacturer; air and water pollution from the paper box manufacturer; threats to the marshlands from the encroachment of new housing, some of which utilizes septic tanks which drain into the marshlands area; and such universal problems as air pollution from cars. The students were also taken on field trips to the university's biological study area in the marshlands; biology professors from the university also came to the schools to give talks and answer questions.

While the program was moderately successful in increasing the students' knowledge and awareness of ways of preserving the environment, all involved agreed that resources for the students' individual study in environmental education were generally lacking. Some books were available which the students could use during their independent study time in the Instructional Materials Center but not nearly enough to satisfy the need. The books also tended to become rather repetitious in the topics they covered. Films tended to be of a low quality, pushed out by publishers to meet a market demand but not always with any definable instructional purpose. Obviously, films were usable only with a large group lecture situation and their half-hour length tended to eat up time. Students could not use them for individual study. The instructors tried to use environmental education "games" to teach students the effects of controlling or not controlling pollution but found they were either not very realistic or drew students' attention to playing the game ("Your country's population starved from over population and mine didn't, so I won," etc.). The committee of middle school teachers that had drawn up the curriculum wrote a final report to Dr. Adams at the end of the school year which included suggestions for improving the program.

This is the situation as it exists at the beginning of Phase A. You will receive more information about the efforts to correct this problem in that phase booklet. For the remainder of the simulation, you are to play the role of Pat Beckley, who will later become the project manager of the simulated project.

Turn now to the Phase A booklet and follow the directions there.

Educational Project Management Instructional System

Simulation Phase A. Planning the Project

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
Suite 1700, 1700 Market Street
Philadelphia, Pennsylvania 19103

May 1973

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Phase A--Planning the Project

Introduction to Phase

A. This booklet contains the following items. Make sure that each item is present before starting to work through the problems.

Page

Introduction to phase. A.1
Overview and objectives. A.2
Abstract and documents list. A.3
Initial instructions A.5
Documents. A.6
Problem instructions A.36
Problem worksheets A.37

B. EQUIPMENT NEEDED

paper
pencils
rulers
drawing equipment for charts
calculator or adding machine is helpful but not essential

C. TIME REQUIRED. It will take approximately 40 minutes to read the documents and problems and about 1 and 1/2 hours to develop solutions.

Phase A--Planning the Project

Overview and Objectives

OVERVIEW

Through a series of documents, including a preliminary draft of a project proposal, the student is presented with a realistic situation in project management in which he must define missions and tasks, plan a work flow, estimate time and resources, and devise a budget.

OBJECTIVES

The general objective of this phase of the simulation is to have the participant integrate or synthesize several specific skills and knowledges which apply to the task of planning a project. For this reason, specific detailed behavioral objectives are not listed below. Instead, general objectives reflecting synthesis or relationships are outlined here. As a consequence of working the simulation phase, the student should be able to better see the relationships existing between the objectives and goals of a project, the sequence of steps necessary to carry them out, how to determine the time and resources needed to accomplish the effort, and how these all combine to form the budget or cost estimate. Integration of these several discrete tasks is important if the student is to be able to plan projects once given the assignment to do so in his actual job situation

Phase A--Planning the Project

Abstract and Documents List

ABSTRACT

Phase A focuses on the activities involved in planning the project. It follows directly from the situation set up in the setting. Dr. Warner Adams and the Environmental Education Committee decide to submit a proposal for a project to develop instructional materials such as film loops and cassette tapes on environmental education topics to alleviate the shortage of such materials. The student, in the role of Pat Beckley, chairman of the committee, submits a preliminary draft of the proposal to the Project Management Office for review and it is returned with numerous criticisms and recommendations for change. Beckley must make the changes required.

DOCUMENTS LIST

Included in the Documents section are the following:

A. Excerpts from the written report of the Environmental Education Committee to Dr. Warner Adams, dated June 8, 1970.

B. Extract from the minutes of a meeting of the Environmental Education Committee in the office of Dr. Warner Adams, on June 15, 1970.

C. Partial transcript of a phone conversation between Dr. Warner Adams and Mr. Charles Greymont of the Division of Research, Planning, and Development of the New Hopewell State Department of Education on June 16, 1970.

D. Extract from the minutes of a meeting of the Environmental Education Committee in the office of Dr. Warner Adams on June 29, 1970.

E. Copy of information on producing film loops written by Dr. George Netzel for the Environmental Education Committee, dated July 6, 1970.

F. Excerpts from the catalog of Century Studios, Inc., Chicago, Illinois, "Dealers in complete lines of photographic equipment, supplies, and services. . .Specialists in educational needs. . . ."

G. Cover letter from Pat Beckley, Chairman of the Environmental Education Committee, to Madeleine Conners of the Project Management Office submitting the preliminary draft of the proposal.

H. Preliminary draft of a proposal entitled "Development and Production of Single Concept Film Loops for Dissemination of Environmental Education to Students in the Middle School."

I. Memo of reply from Madeleine Conners to Pat Beckley attached to the copy of the preliminary draft of the proposal which had been sent to the Project Management Office for review. Includes PMO forms for rewriting the proposal.

Phase A--Planning the Project

Initial Instructions

Directions: On the following pages are a series of documents relating to the development of a proposal to produce instructional packages in environmental education. Read these documents carefully since each one contains information which will help orient you to the problems or may aid you in devising solutions. Each document is identified at the top as to its source and nature.

After reading them, you will be asked to complete several forms in this simulation phase. You may refer to these documents for any information you may desire in completing these forms.

After completing the forms, check your answers.

Turn the page and begin reading.

Document A

Excerpts from the written report of the Environmental Education Committee to Dr. Warner Adams, dated June 8, 1970.

from the section titled "Goals of Environmental Education. . ."

A graduate of the Armitage City Schools should:

1. Be aware of the dangers inherent in the population explosion.

2. Be aware of man's dependence on nature for all the necessities for physical survival, and be aware that man is the only creature capable of consciously altering his environment.

3. Value a quality environment over the immediate possession of material goods and be aware that the production of material goods is dependent on the quality of the environment.

4. Be aware that esthetic environment is essential to man's social and mental well being.

5. Accept personal and individual responsibility for maintaining and restoring quality in his environment.

6. Be aware of legal and political avenues through which these objectives can be attained.

from the section titled "Recommendations. . ."

> The environmental education curriculum was tried on a tentative basis during the last half of the school year. . .This "pilot program" also demonstrated a crucial need for additional learning resources which can be used with small group instruction involving ten or fewer students and with individual students during their independent study time in the instructional Materials Center. It was the opinion of the committee that greater attention should be given to procuring or creating materials which can be so utilized. Such materials should be fairly low in cost, simple enough for students to use in their independent study carrels, or in small groups, and related to a specific instructional topic or objective. The committee recommends consideration of such items as filmstrips, film loops, cassette tapes, and brief illustrated booklets to fill this need.

Document B

Extract from the minutes of a meeting of the Environmental Education Committee in the office of Dr. Warner Adams, on June 15, 1970.

. . .The problem of instructional materials for use in the environmental education program was brought up. After discussing various experiences with existing materials and their problems, it was generally agreed among the committee members that priority should be given to developing a set of instructional materials on environmental education which would utilize 8 mm film loops and cassette tape narrations. These are to be coordinated with the curriculum already devised by the committee. Specific topics for the items would be suggested by the teachers involved and by experts from the university and community. The possibility of including a brief instructional booklet with each film loop-cassette package was also considered.

The problem of financing the production of such items was considered briefly. Dr. Adams said he would check with Mr. Charles Greymont in the Division of Research, Planning, and Development in the New Hopewell State Department of Education about the possibility of financing the project under a Title III grant. . . .

Document C

Transcript of a phone conversation between Dr. Warner Adams and Mr. Charles Greymont of the Division of Research, Planning, and Development on the New Hopewell State Department of Education on June 16, 1970.

Adams: . . .but this problem of the instructional materials not being adequate has really hampered our whole environmental education effort.

Greymont: Well, of course, we've had similar complaints from other schools around the state. This certainly isn't just your problem. We'd like to do something but the question is what to do. Have you got any ideas?

Adams: Our committee talked about it at some length and generally agreed that the best approach would be something which the kids could handle on their own but would be something other than the usual textbook kind of thing. With our instructional Materials Center and its equipment, they thought that a set of film loops and cassettes, and maybe even some short booklets on various topics would be a good approach. Quite frankly, though, we just don't have the funds for anything like that for next year. I'm sure we could get the people to work on it but I was wondering if you thought a Title III proposal for such a job would have a reasonable chance for being funded if we submitted it.

Greymont: Umm-mm- Yes, that sounds like a good idea. I like the notion of using the film loop and cassette approach. The technology has been spreading to most of the schools in the state and I'd like to see it used more and used more effectively. If you could develop something along this line, I'm sure quite a few people would be interested in using the products you come up with. Let's do it this way. In a few days, we plan to issue a Request for Proposals under Title III that deal specifically with projects in environmental education. Why don't you write something up; I'm sure that we could probably guarantee you funding if your proposal is as good as it sounds.

Adams: Great! What's our time look like on this?

Greymont: Well, let's see, today is June 16. The RFP will go out on about the twentieth. The deadline for submission of proposals is August 20. I know this is kind of a short time but we'd like to get these approved so they can start with the beginning of the school year on September 6.

Adams: No, I don't think that will be any problem. I can get the middle schools' committee to sit down and get this out. Getting them all together may be a bit of a problem at this time of year, but I'm pretty sure that we can get the job done.

Greymont: Fine, Warner. I'll be looking forward to seeing what you come up with.

Document D

Extract from the minutes of a meeting of the Environmental Education Committee in the office of Dr. Warner Adams on June 29, 1970.

. . .It was agreed that a proposal titled "The Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School" would be written. The chairman of the Environmental Education Committee, Mrs. Pat Beckley, would write the proposal with the help of the other members of the committee. Dr. Adams would arrange for assistance from the Project Management Office in reviewing the proposal before submitting it for consideration for funding.

Committee members were unfamiliar with the technical aspects of producing film loops. Dr. Adams will contact a member of the education faculty at Miskatonic University who has had experience in audio-visual materials and ask him to provide a memorandum for guidance in the making of film loops.

The initial draft of the proposal is to be submitted for review to the Project Management Office no later than July 20.

Document E

Copy of information on producing film loops written by Dr. George Netzel for the Environmental Education Committee, dated July 6, 1970.

To: Environmental Education Committee, Armitage Middle Schools

From: Dr. George Netzel, Professor, School of Education, Miskatonic University

Subject: Production of Film Cartridges

Date: July 6, 1970

In response to your request for an overview of the methodology of producing film loops or cartridges, I am submitting the information below. There are many references available on this topic, so I have not tried to go into much detail.

Methods of Production

There are two general ways of producing 8 mm film loops. The first is "film clipping," a method in which sections of longer films are clipped and put together to make a duplicate film; this is generally not a very acceptable method. The second method involves producing an original film which can then either be shown directly without duplication or can be used to make duplicate copies.

Film Planning

The preliminary planning for a film must consider the intended length of the film, its subject, and the needs, characteristics, and background of the audience or individual users of the film. The final step is to outline the subject content that supports the objective and will serve as the basis for film scenes. There should be a precise statement of objectives for the film.

A film script or shooting outline should be used to organize both the text or title and demonstration, if a demonstration is to be used in the film. This is usually done by means of the "Story Board" technique. In this process, the content is organized into story-telling form and visually produced as a series of sketches that pictorially illustrate the content. Finally, a script is written based upon the content and illustrations. Thus, the story board consists of a listing of specific scenes to be filmed with accompanying narration for the cassette tape if such is used. Each scene has a description of content and indication of camera position.

Equipment

A number of references are currently available on equipment technology and these should be consulted. Valuable information can also be obtained by corresponding with equipment manufacturers and by consulting their brochures because the technology in this area changes rapidly. Equipment can be grouped under the categories of film making equipment and film projection equipment.

Producing 8 millimeter films directly requires such basic equipment as a camera, lights, a tripod, lens filters, film splicing equipment, editing equipment, and a light meter. There are many types of cameras on the market, ranging in price from about $30 to $1,000; the film maker should expect to pay from $200 to $250 for one adequate for the task involved here. As a minimum the camera should have an optical viewfinder to see the exact limits of a scene, a zoom lens to allow a wide selection of image sizes (electrically operated), and an electric eye which controls the aperture at stop settings.

It is also desirable to have a fast lens (F2 or better) with through the lens reflex viewing, automatic exposure with manual override and a range of camera speeds. The tripod should be sturdy and have a reliable means of controlling height. A good light meter is useful even if the camera has one built in. It may be necessary to have close-ups, shoot titles, or copy pictures and a built-in meter may give an improper lens diaphragm setting. An incident type light meter is prefered.

Lighting equipment should include at least four lamps mounted on tripod supports (375-500 watt) and several clip-on reflectors. A film splicer and viewer is necessary, as it is difficult to take a film without careful editing of scenes and sequences. A tape recorder with a precise control is important for editing taped narration, together with a good cassette recorder if the camera and equipment used do not permit sound on the film.

A very important consideration in the film production is the number of copies to be made of each film. If several copies are needed, the original film should be produced on 16 millimeter film than professionally reduced to copies of 8 mm size. Commercial ektachrome type 16 mm film is designed for reproduction purposes; it is recommended for quality and clarity. A list of laboratories which provide this service is attached at the end of this memo.

It is possible to make duplicate copies from the original 8 mm but the quality is often disappointing. The copy is somewhat grainy, colors are not true, and there is too much contrast (i.e., the lighter colors become whiter and the darker colors become blacker). However, the films are quite adequate for instructional purposes that do not require intricate detail.

Filming

After determining the general approach to be taken, and after scripts are carefully reviewed, the filming should be carefully studied with respect to the objectives defined for the films. A variety of shots should be planned, avoiding long shots and concentrating on medium and close-up shots. Definite, easy scene motions should be used, and transitions between scenes carefully developed to provide continuity. It is desirable to use sequences longer than actually required to provide for editing. However, with careful planning and shooting it is possible to edit a film as it is shot by including all sequences in the order desired. This results in a film complete in one piece at a lower cost.

Costs

Many references list the costs of film production. Remember that these are constantly changing, and that the true cost of the finished film also includes trials and errors and rejected film. Costs for color film are given as $5 to $6 per cartridge (Olsen, 1966), $1 to $3 per running minute (O'Connor, 1967), $5.50 to $7 per unit, with $1.50 to $3 extra for sound (Brown, 1964). Kemp (1968) notes the cost of 16 mm commercial film as $13 per roll, and duplication costs for reduction to 8 mm as $15 per 8 mm foot. The subject of cost is a variable which can be viewed in many ways and will be dependent entirely upon the circumstances in which the films are made. Usually, however, direct filming in 8 mm is one-third the cost of 16 mm.

Projection Equipment

One of the newer developments in 8 mm film technology is the cartridge reel to reel as in the Kodak Ektographic projector. Projectors which take 8 mm cartridge films are of two major types: those which require a separate screen and those which have a built-in screen with or without sound capability. The projectors which utilize sound and a built-in screen include the following models:

Fairchild Mark IV, Mark V, Model 24

Jayark Super 8

Technicolor Super 8, Model 1000B, Model 1300

These use an 11 to 30 minute cartridge with optical sound and range in price from $365 to $500. The projectors which do not include sound range from $110 to $154 and include the Kodak Ektographic 120, Technicolor 510, the McLure 510 and the Technicolor 810. Cassette play back units and cassette recorders range from $20 to $40 for low cost units acceptable for individualized instruction.

Cartridges for these units require loading and treating. Cost for these cartridges are from $6.60 to $9.95 per cartridge with a minimum of $4 for treating and $1.50 to $3 for loading.

To provide sound with a silent cartridge film, there are several methods to synchronize a tape recorder adn projector. Bell and Howell has a cassette recorder (Model 45--price $99.95) which can be used to coordinate with a projector to produce a sound movie playback. The recorder is electrically connected to the projector and cued on the cassette tape when to start and stop the film.

Film Laboratories Providing Film Reduction and Duplication Services

Cinema Corporation
3415 North Broadway
Houston, Texas

Superior Film Industries
354 West Cherry
Burbank, California

Smith Film Laboratory
2704 West Howard Street
Memphis, Tennessee

Consolidated Films
1104 Johnson Road
Kansas City, Missouri

Thomas Productions, Inc.
665 Lincoln
Chicago, Illinois

Document F

Excerpts from the catalog of Century Studios, Inc., Chicago, Illinois, "Dealers in complete lines of photographic equipment, supplies, and services. . .Specialists in educational needs. . ."

Supplies section. . .

Reel of 16 mm color film, 100 feet	$ 9.00
Reel of 8 mm color film, 100 feet	2.50
400 watt replacement bulb	5.00

Equipment section. . .

Lighting tripod, adjustable, with height adjustment	24.00
Splicing kit, 16 mm splicer, with supplies	18.00
Splicing kit, 8 mm splicer, with supplies	18.00
Splicing kit, replacement supplies, 8 or 16 mm	7.00
Banzai 8 mm movie camera, with F2 lens, assorted filters, adjustable speed, manual override, built-in light meter	225.00

Educational services. . .

Reduction of 16 mm to 8 mm	$26/min.
Preparation of film loop cartridges (8 mm) including cartridge, loading and treating, per cartridge	6/min.
Duplication of 8 mm film	3/min.

Document G

Cover letter from Mrs. Pat Beckley, Chairman of the Environmental Education Committee, to Miss Madeleine Conners of the Project Management Office, submitting the preliminary draft of the proposal.

Wayson Middle School
July 20, 1970

Miss Madeleine Conners
Project Management Office
Armitage City Schools
Armitage, New Hopewell

Dear Miss Conners:

Enclosed is a preliminary draft of the proposal on producing film loops in environmental education. It is my understanding that this is to be reviewed by your office for its adherence to proper project management techniques.

I realize that it probably has a number of places for improvement and therefore await your advice for improving it. However, I do ask that it be returned in ten days since we must have time to rewrite it before the August 20 submission deadline.

Sincerely,

Pat Beckley

Pat Beckley

PB/sf

Document H

PROJECTS TO ADVANCE CREATIVITY IN EDUCATION

Title III--Elementary and Secondary Education Act as Amended

Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School

Submitted by

Armitage City Schools
Armitage, New Hopewell

August 1970

STATEMENT OF THE PROBLEM

It is generally agreed that there is a current necessity for increasing students' awareness of their environment and its quality and the methods by which it may be improved and preserved. Current methods of providing information in environmental education through conventional textbooks, 16 mm films, and other means are largely suited for large groups and classroom situations. During the past school year, this school district has devised and tried a pilot program of environmental education in two of its middle schools. It was found that conventional texts and films were useful with large group instruction situations but materials usable in small group instruction and by students studying individually in the schools' Instructional Materials Center were sorely lacking in both quantity and quality. It would appear that environmental education information could be more readily acquired if methods or techniques can be devised to permit individualized instruction. Since audio-visual authorities consider the 8 mm film loop a neglected but effective learning tool, the investigators believe that the development of 8 mm single concept film loops of selected topics in environmental education should provide a means for individualized instruction in this area.

The specific problem is to develop, produce and field test 8 mm film loops of selected topics in environmental education.

REVIEW OF RESEARCH

The review of the literature indicates the urgent need to provide information about the use, improvement, and preservation of the environment for individuals of all ages. It is particularly important to provide such information to those who are at an age when they are forming values and attitudes about the conduct of their life and when they are becoming increasingly aware of the world around them outside the school.

There is little doubt as to the efficacy of the use of audio-visuals as a means of imparting information for instructional purposes. Evidence of this was the emphasis placed on the use of films in the schools in the early thirties and the lavish use of films by the armed services in World War II. These films are much longer than the film loops projected for this project. The use of the 8 mm single concept film loops is a relatively recent development in education instruction and its potential for use in the area of environmental education has not yet been thoroughly investigated.

Since 1962 the literature is replete with numerous articles on the 8 mm film cartridge as a teaching tool. The 8 mm film avoids the need to stop a longer film in order to transmit concepts (Ingraham, 1966), enables the child to study what he wants when and where he wants (Finn, 1962), and enables students to "think visually." Other advantages of the 8 mm film loops are said to be low cost of production (Brown, 1964; Evans, 1966; Gaffney, 1962; Miller, 1965) and the immediate accessability to both student and teacher as opposed to the difficulties of obtaining the longer 16 mm films (Williams, 1964; Miller, 1965; Forsdale, 1962). The production of 8 mm film loops may be accomplished in two ways. They may be produced directly as 8 mm color films or in 16 mm and then reduced to 8 mm.

The direct production of 8 mm films costs less but lacks in clarity and quality. The use of 16 mm and subsequent reduction enables prints to be made from the original and results in more acceptable technical quality.

Personal correspondence with audio-visual personnel supports the theory of the investigators that 8 mm film loops to portray selected topics in environmental education should be carefully planned and professionally produced, and of no longer duration than three to four minutes. They conclude that the best approach in a complex problem is to utilize knowledgeable consultants, and reduce the film from 16 mm film. Numerous articles are also available on methods of producing the film loops, but those which are most complete are the Production and Use of Single Concept Films in Physics Teaching, Movies With a Purpose, Guidelines to Preparation and Evaluation of Occupational Films, and Planning and Producing Audio-Visual Materials.

There is abundant research to indicate that individualized educational techniques can enable students to learn more in a shorter period of time.

The 8 mm film loop was found to be effective in the review of instruction and for experimentation (Schofield, 1966). The advantages of the film loop, locally produced are suggested by Brown (1964), Finn and Rosengreen (1962), and Miller (1967), who cite low cost, substitution for field trips, and convenience of use.

The need for the production of 8 mm environmental education films is highlighted by a review of the catalogs of audio-visual materials. Although there are over 3,000 current titles, only two references were located which were concerned with the use of motion pictures to provide information on environmental problems (Hill and Black, 1963).

With the exception of the report of Louis Forsdale, "Eight Millimeter Film in Education, Its Emerging Role," which substantiates the belief of the investigators in the importance of this media, a review of Research in Education produced no additional information of specific pertinence to the study.

In the absence of research or literature thus far reviewed by the investigators which identifies the availability of 8 mm loops in the area of environmental information and the suggested validity of this method as an instructional technique, it would appear that research on the development and testing of such films is well warranted.

OBJECTIVES OF THE STUDY

1. To identify a series of topics in environmental education relevant to the use, improvement, and presentation of environmental resources.

2. To develop and produce a limited number of 8 mm single concept film loops that describe environmental issues and problems.

3. To develop instructional materials which will serve as a guide for the use of the films in providing environmental education for groups and individual instruction.

4. To evaluate the completed films and instructional materials for accuracy of content and use as an instructional media by a committee of audio-visual, environmental, and educational consultants.

5. To provide information relative to the developmental procedures and costs involved in the production of 8 mm environmental information film loops for facilitation of further research.

6. To provide recommendations for the duplication and dissemination of the 8 mm film loops and instructional materials for subsequent statewide evaluation in selected environmental education courses.

DESCRIPTION OF ACTIVITIES

Step 1. Review the literature and research relating to the use of films as instructional media. This will be done to identify the general effectiveness of audio-visual media as an instructional technique and the existence of such media of any type specifically designed for the dissemination of environmental information.

Step 2. Investigate the development, production and utilization of 8 mm single concept film loops. This should result in the selection of the most appropriate techniques pertinent to completion of the project.

Step 3. Identify a sequence of related topics in the use, improvement, and preservation of natural resources which will be important to responsible living. This will be accomplished by review of the literature on environmental problems, review of projection of future needs and problems on the local and national level, and the suggestions of university and government consultants.

Step 4. Review the information from literature and consultants with writers who will develop the script for production of the film loops.

Step 5. Provide the scripts to consultants for review of accuracy of topic description and inclusion of necessary information.

Step 6. Prepare a filming schedule and produce 16 mm color films of selected topics. Edit the films and reduce to 8 mm single concept film cartridges. Narration and background sound track will be added.

Step 7. Develop instructional materials as a guide for film content and use.

Step 8. Provide film cartridges to selected audio-visual and teaching personnel for evaluation of environmental information materials.

Step 9. Analyze information and prepare recommendations for further research.

Step 10. Submit final report.

USE TO BE MADE OF FINDINGS

1. Information relative to the developmental procedures and the costs of producing 8 mm environmental education film loops will be available for dissemination through the ERIC information system.

2. Recommendations for the statewide evaluation of the effectiveness of film loops for dissemination of environmental education information compared to traditional methods will be made.

PERSONNEL AND FACILITIES

Project Director

Pat Beckley, science teacher at Wayson Middle School, Armitage, New Hopewell. Received a B.S. in 1963 from Miskatonic University in Education with a major in biology and has taught in the schools of Armitage since that time. Pat Beckley has served in the past year as chairman of the Environmental Education Committee of the Armitage City School system and has supervised the writing of objectives and content of the pilot program in environmental education. Will be employed half-time on the project.

Consultants

Dr. Joseph Brown, Professor of Zoology at Miskatonic University. Dr. Brown has been active in various conversationist groups and has published several articles on the need for conservation education.

Dr. William J. Hanson, Professor and Head, Department of Science Education, Miskatonic University. Dr. Hanson has 23 years of experience in the field of science education.

Dr. George Netzel, Professor of Audio-Visual Education, Miskatonic University. Dr. Netzel has had extensive experience in designing and producing instructional materials.

Mr. Arthur Fries, Agent for the U. S. Forestry Service.

Mr. Howard Butler, Chief, Community and Industrial Service Section and in charge of the Regional Office of the Department of Conservation and Development of the state of New Hopewell.

Typists

It is estimated that one typist will be needed on a full-time basis to type scripts, guidelines, etc.

Investigators/Writers

Two investigators will be hired to research the literature and conduct interviews with the consultants to identify topics in environmental education that will be filmed and to analyze the use of the film loops in instruction. These individuals will be employed quarter time.

Script Writers

Four script writers will be employed to write the scripts for the film loops and for the accompanying instructions and guidelines. Two of them may be the investigators just described.

Professional Photographer

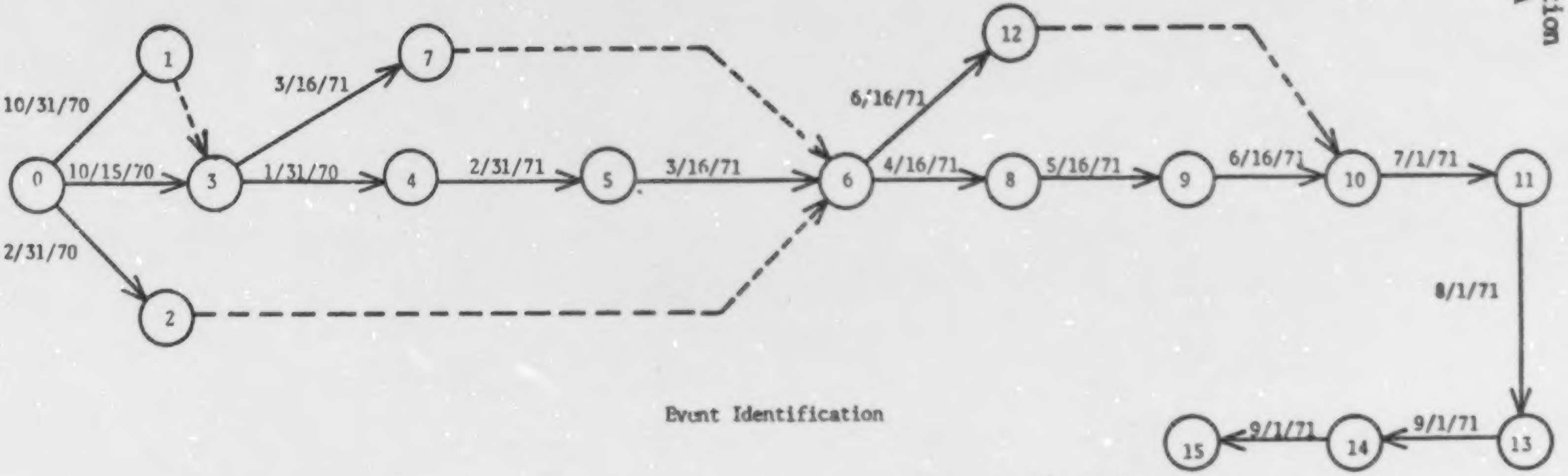
A professional photographer will be used to make the actual films.

Research Assistant

Miskatonic University has agreed to provide one graduate student to act as an assistant to the project. It has done this on previous occasions on other projects as a way of providing a practicum for students in various areas. Whether or not such a student is hired depends on the availability of a student with an interest in this area.

Facilities

Office space will be provided in a room in Wayson Middle School. Films will be taken at various local locations including the local marshlands and river. Films will be edited in a professional studio.



Event Identification

1. Review of literature and research relating to the use of films as an instructional media completed.

2. Investigating the development, production and utilization of 8 mm single concept film loops completed.

3. Identifying a sequence of related topics in environmental education relevant to the objectives of the environmental education curriculum.

4. Conduct interviews with consultants in environmental education.

5. Reviewing content of interviews completed.

6. Reviewing the scripts for securing of topic description and inclusion of necessary topic information completed.

7. Preparing filming schedule completed.

8. Producing 16 mm films of selected topics completed.

9. Editing 16 mm films completed.

10. Reproducing the 16 mm films on single 8 mm films completed.

11. Adding the narration and background sound track to the 8 mm films and placing them in cartridges completed.

12. Developing instructional materials for each film completed.

13. Evaluating completed films by audio-visual and environmental experts.

14. Analyzing the project and making recommendations for further research completed.

15. Submitting final report completed.

Project Work Flow

Simulation
Phase A

Work Plan

EVENT PREDECESSOR	EVENT SUCCESSOR	ACTIVITY DESCRIPTION	PERSON OR PERSONS RESPONSIBLE FOR ACTIVITY	NETWORK SCHEDULE START DATES MONTH	DAY	YEAR	NETWORK SCHEDULE COMPLETION DATES MONTH	DAY	YEAR	SCHEDULE BEGIN MONTH	DAY	YEAR	SCHEDULE FINISH MONTH	DAY	YEAR
0	1	Reviewing literature relating to the use of films on instructional media	Investigators and director	9	1	70	10	31	70						
0	2	Investigating the development, production, and utilization of 8 mm single concept film loops	Investigators and director	9	1	70	2	31	71						
0	3	Identifying a sequence of related topics in environmental education relevant to the objectives of the environmental education curriculum.	Investigators and director	9	1	70	10	15	70						
3	7	Preparing filming schedule	Director	11	1	70	3	16	71						
3	4	Conducting interviews with consultants in environmental education.	Investigators.	11	1	70	1	31	71						
4	5	Reviewing content of interviews	Director	1	31	71	2	31	71						
5	6	Reviewing film scripts for securing of topic description and inclusion of necessary topic information.	Director and consultants	2	31	71	3	16	71						

Work Plan

EVENT		ACTIVITY DESCRIPTION	PERSON OR PERSONS RESPONSIBLE FOR ACTIVITY	NETWORK SCHEDULE START DATES			NETWORK SCHEDULE COMPLETION DATES			SCHEDULE					
										BEGIN			FINISH		
PREDECESSOR	SUCCESSOR			MONTH	DAY	YEAR	MONTH	DAY	YEAR	MONTH	DAY	YEAR	MONTH	DAY	YEAR
6	8	Producing 16 mm color films of selected topics	Photographer and director	3	16	71	4	16	71						
6	12	Developing instructional materials for each film	Director, graduate student, and writers	3	16	71	6	16	71						
8	9	Editing 16 mm films	Director, and consultants	4	16	71	5	16	71						
9	10	Reproducing the 16 mm films on super 8 mm film	Photographer	5	16	71	6	16	71						
10	11	Adding the narration and background sound track to the 8 mm film and placing them in cartridges	Photographer, director, graduate student, and writers	6	16	71	7	1	71						
11	13	Evaluating completed films by audio-visual and environmental experts	Audio-Visual & environmental consultants	7	1	71	8	1	71						
13	14	Analyzing the research and making recommendations for further research	Project staff	2	1	71	9	1	71						
14	15	Submitting final report	Director	9	1	71	9	1	71						

PROJECT COST ESTIMATES

Total Project Costs

Personnel Salaries	$ 4,000
Employee Benefits	260
Travel	300
Supplies and Material	450
Communications	50
Services	
Duplic. and Repro.	200
Statistical	
Testing	
Other	3,000
Final Report	300
Equipment	360
Trainee Cost	
Institutional Allowance	
Other Direct	
Subtotal Direct Cost	8,920
Indirect Costs	1,080
Total Project Costs	10,000

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Phase A--Planning the Project

Document I

Letter of reply from Madeleine Conners to Pat Beckley attached to the copy of the preliminary draft of the proposal which had been sent to the Project Management Office for review.

To: Mrs. Pat Beckley, Chairman, Environmental Education Committee

From: Miss Madeleine Conners, Director, Project Management Office MC

Subject: Needed corrections to preliminary draft of Proposal "Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School"

Date: July 25, 1970

Several staff members of this office and myself have reviewed this proposal draft and find that it has several serious shortcomings which will necessitate rewriting portions of it. We have not attempted to criticize the rationale for the project itself since that is beyond the scope of our competence. The criticisms below deal with the management aspects of the project only.

1. The work breakdown structure of the project is practically non-existent. The "Description of Activities" which you give is not adequate for planning the project properly. It is also inaccurate in that it does not include the obvious activity of writing the scripts. You need to define the missions, tasks, and sub-tasks needed to reach your goal of developing and producing the film loops. It seems to the staff here that your project has three major missions: (1) an analysis and review of literature on films and environmental topics, (2) the production of the materials themselves such as films, additional written materials, etc., and (3) the evaluation and analysis of the final product. I am enclosing a copy of PMO Form 1 Work Breakdown Structure. Please use this form to complete a proper structure. I have taken the liberty of filling in the three major missions indicated.

2. Once you have done a correct work breakdown structure, you can construct a new flow chart along with the time estimates involved. Your present flow chart has a number of errors in it. In addition, your chart is an event oriented chart but your table titled "Work Plan" seems to be activity-oriented. Do just one kind of chart. A copy of PMO Form 2 Project Work Flow Chart is also enclosed. Please follow the instructions on it for making a new flow chart.

3. Once you have made a work breakdown structure and a work flow chart with estimated times, complete PMO Form 3 Task Event Resource Calendar for the tasks you listed in column 2 of PMO Form 1. You will not include this chart in your final rewritten proposal but it will be useful in figuring your budget and will give me some idea of what you intend for each task.

4. Complete a revised budget for your project using the PMO Form 6 Project Budget. I have again filled in a few items but leave the rest to you.

Please complete these and return them to me as soon as possible.

Phase A--Planning the Project

Problem Instructions

Directions: The pages that follow contain the forms noted in the memo from Miss Madeleine Conners. You now have the task of completing the forms using the information contained in the documents in Phase A and the simulation setting.

After you have completed the forms, evaluate your answers.

If you are performing the simulation by yourself, turn to the Phase A Critique and Checklist section of the Simulation Manual.

If you are working through the problem as a member of a team, follow the group leader's instructions for evaluating your answer.

Turn the page and begin to complete the forms.

Project Work Breakdown Structure

Project Title:

Tentative Project Dates: From To

State General Objective of Project:

Missions	Tasks	Sub-Tasks
1. Analysis of the literature		
2. Developing and producing the film loops		
3. Evaluating the final product		

(PMO Form 1)

Simulation
Phase A

Project Work Flow Chart

Project Title: ____

Directions for completion: PMO Form 1 should be completed first. Using information from that form, diagram either an event or activity oriented flow chart. The chart has been pre-numbered by week for a period of one year. If the project is intended to last longer than one year, continue the flow chart on a second copy of this form. Indicate the dates for each week below the week numbers. To save space, you may indicate events or activities by numbers on the flow chart. The event or activity associated with each number should be listed below. Continue on the back if necessary.

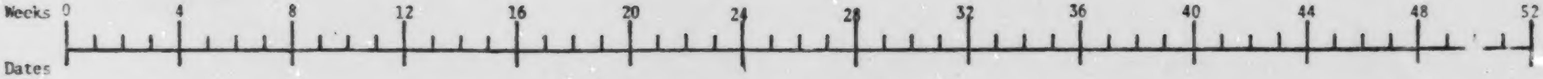
After drawing the flow chart, assign times to each event or activity. Write this on the flow chart and in the table below. Find the critical path of the work flow and emphasize it on the flow chart by making the path in a bolder or colored line. Also calculate the total time for the critical path and enter it in the table. If an event or activity is on the critical path, put the letters "CP" to the left of the activity or event numbers.

Critical Path? (CP)	Event or Activity Numbers	Event or Activity Description	Event or Activity Times in Days/Weeks (Indicate one)

(PMO Form 2)

Total Critical Path Time? ____________

Simulation
Phase A



PROJECT WORK FLOW CHART

(PMO Form 2 continued)

Task-Event-Resource Estimation Calendar

Project Title: ______________________ ______________

Anticipated Dates: ______________________________

Directions for completon: This form is designed to assist in the construction of a task-event-resource calendar for a project. PMO Form 1 Work Breakdown Structure should have been previously completed. Based on the information in that form, indicate the personnel, resources, and services needed for each task (from column 2 of PMO Form 1). You may omit the project manager from the task personnel since it is assumed that he is involved in all tasks.

Task-Event-Resource Calendar

Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.

(PMO Form 3)

Project Budget

Directions for completion: Complete the various sections below as indicated. Standard travel and per diem costs according to school board policies have been entered. Assign costs for each item by mission and place the subtotal for each item in the "Project Subtotal" column. Place the salary cost for the project director in this latter column but do not place any salary estimate for him in the mission columns. Be sure to assign each item a line item number.

Line Item No.	Item Description	Mission			Item Subtotal
		1	2	3	
	A. Direct costs				
	1. Personnel				
1	a. Project Director, P. Beckley 1/2 time for 12 mos. @ 7200/yr.				
2	b. Investigators (2) 1/4 time for __mos. @ 7200/yr				
3	c. Writers (2) 1/4 time for __mos. @ 7200/yr				
4	d. Consultants in audio-visual techniques (1) @ 75/day for ___days				
5	e. consultants in environmental education (4) $75/ day for ___days				
6	f. Typist-clerical assistant full-time @ 5400/yr for ___mos.				
7	g. Professional photographer @ 500/mo. for ___mos.				
8	h. Graduate student assistant @ 400/mo. for ___mos.				
9	PERSONNEL SUBTOTAL				
10	2. Employee Benefits (10% of all salaries)				
11	BENEFITS SUBTOTAL				

(PMO Form 4)

Line Item No.	Item Description	Mission 1	Mission 2	Mission 3	Item Subtotal
	A. Direct Costs (cont/d)				
	3. Travel				
12	a. Transportation (Maximum of 50/day or per trip)				
	b. Per diem (25/day)				
	TRAVEL SUBTOTAL				
	4. Supplies and Materials				
	SUPPLIES AND MATERIALS SUBTOTAL				
	5. Services				
	SERVICES SUBTOTAL				

(PMO Form 4 cont'd)

Line Item No.	Item Description	Mission			Item Subtotal
		1	2	3	
	A. Direct Costs (cont'd)				
	6. Final Report production (Standard Central Duplicating costs, 3/copy)				
	7. Equipment				
	EQUIPMENT SUBTOTAL				
	SUBTOTAL DIRECT COSTS				
	B. Indirect Costs (8% of direct costs)				
	TOTAL COSTS (A + B)				

STOP!

Check your responses to Phase A at this point by referring to the Critique and Checklist section of the Simulation Manual.

Educational Project Management Instructional System

Simulation Phase B. Preparing the Project

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
Suite 1700, 1700 Market Street
Philadelphia, Pennsylvania 19103

May 1973

680

Phase B--Preparing the Project

Introduction to Phase

A. This booklet contains the following items. Make sure that each item is present before starting to work through the phase.

Page

Introduction to phase B.1
Overview and objective B.2
Abstract and documents list B.3
Initial instructions. B.4
Documents B.5
Problem instructions. B.22
Problem worksheets. B.23

B. EQUIPMENT NEEDED

paper
pencils
drawing equipment for charts
manual for checking responses

C. TIME REQUIRED. It will take approximately 40 minutes to read the documents and problems, and about 1 to 1 1/2 hours to develop solutions.

Phase B--Preparing the Project

Overview and Objectives

OVERVIEW

Phase A of the simulation dealt with activities involved in the planning of a project. Activities included devising a work breakdown structure and work flow, securing time estimates, establishing a task-event-resource calendar, and deriving a budget.

Phase B begins with an assumption that the final version of the proposal has been submitted and funded. It is now necessary to conduct implementation and gear-up activities such as hiring personnel; delineating organizational structure and responsibilities; designing a reporting system; and specifying needs for equipment and materials; securing space; and establishing the project information system.

OBJECTIVE

The general objective of this phase is to have the student pull together the many diverse but necessary activities which follow as a result of a project proposal being funded. While they can be thought of as discrete activities, the many tasks have strong inter-relationships as one initiates a project effort.

Phase B--Preparing the Project

Abstract and Documents List

ABSTRACT

A final revised version of the proposal has been submitted to the New Hopewell State Department of Education and approved for funding. Upon the approval of the proposal for funding, certain actions need to be taken to implement the project. Madeleine Conners writes to you as the project director requesting information concerning the hiring of personnel, the establishment of a project information reporting system, the space and facilities needs of the project, and other items of information so the Project Management Office can provide adequate support to the project. Your task is to respond to Madeleine Conners' memo.

DOCUMENTS LIST

The following documents are included in this phase in the order indicated:

A. A revised version of the proposal submitted to the New Hopewell State Department of Education.

B. A letter from Charles Greymont of the Division of Research, Planning, and Development of the New Hopewell State Department of Education approving the proposal for funding.

C. A letter from Madeleine Conners to Pat Beckley requesting project start-up information (including forms for responding).

Phase B--Preparing the Project

Initial Instructions

Directions: Read the documents on the following pages. Be particularly careful to study the revised version of the proposal included here. It is this proposal which will be used for the remainder of the simulation It is not intended to be a "right answer" to the problems posed in Phase A nor is it intended to be a "model proposal" for a project. Some errors have purposely been built-in to provide a basis for further activities in the simulation. If you have had experience in proposal writing, it is likely you will disagree with some of the ways in which the proposal was handled.

Document A

The following pages contain the text of the proposal which was submitted for consideration for funding. The project is designed to run from September 1, 1970 to August 31, 1971, and requests a funding of $27,496.

Simulation
Phase B

B.6

PROJECTS TO ADVANCE CREATIVITY IN EDUCATION

Title III--Elementary and Secondary Education Act as Amended

Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School

Submitted by

Armitage City Schools
Armitage, New Hopewell

August 1970

A. STATEMENT OF THE PROBLEM

It is generally agreed that information about the use, restoration, and preservation of our environment has become an important topic in the education of young people. Current methods of providing this information through printed materials, 16 mm films, records and slide projectors are appropriate for large groups and classroom situations. It would appear that environmental education information could be more readily acquired if methods or techniques can be devised to permit individualized instruction. Since audio-visual authorities consider the 8 mm film loop a neglected but effective learning tool, the investigators believe that the development of 8 mm single concept film loops of selected topics in environmental education should provide a means for individualized instruction in this area.

The general problem is to develop, produce and field test 8 mm film loops of selected topics in environmental education.

B. REVIEW OF RESEARCH

The review of the literature identifies the urgent need to provide information about the use, restoration, and preservation of our environment. The root of the environmental problem lies buried in complex and fundamental cultural and socio-cultural values that are transmitted in part to children through their public education experience. Environmental education in the middle school reaches students at a time when they are forming values for their lives and reaching out to a larger outside world.

There is little doubt as to the efficacy of the use of audio-visuals as a means of imparting information for instructional purposes.

Evidence of this was the emphasis placed on the use of films in the schools in the early thirties and the lavish use of films by the armed services in World War II. Films are widely used in classrooms around the world today. These films are much longer than the film loops projected for this project. The use of the 8 mm single concept film loop is a relatively recent development in educational instruction and its potential for use in the area of environmental education has not yet been thoroughly investigated.

Since 1962 the literature is replete with numerous articles on the 8 mm film cartridge as a teaching tool. The 8 mm film avoids the need to stop a longer film in order to transmit concepts (Ingraham, 1966), enables the child to study what he wants when and where he wants (Finn, 1962), and enables students to "think visually." Other advantages of the 8 mm film loops are said to be low cost of production (Brown, 1964; Evans, 1966; Gaffney, 1962; Miller, 1965) and the immediate accessability to both student and teacher as opposed to the difficulties of obtaining the longer 16 mm films (Williams, 1964; Miller, 1965; Forsdale, 1962). The production of 8 mm film loops may be accomplished in two ways. They may be produced directly as 8 mm color films or in 16 mm and then reduced to 8 mm.

The direct production of 8 mm films costs less but lacks in clarity and quality. The use of 16 mm and subsequent reduction enables prints to be made from the original and results in the technical quality which is suggested by experts in the field.

Personal correspondence with audio-visual personnel supports the theory of the investigators that 8 mm film loops to present topics in environmental education should be carefully planned and professionally produced, and of no longer than three to four minutes. The investigators have concluded that the best approach in a complex problem is to utilize knowledgeable consultants, and reduce the film from 16 mm film. Numerous articles are also available on methods of producing the film loops, but those which are most complete are the Production and Use of Single Concept Films in Physics Teaching, Movies with a Purpose, Guidelines to Preparation and Evaluation of Occupational Films, and Planning and Producing Audio-Visual Material.

There is abundant research to indicate that individualized educational techniques can enable students to learn more in a shorter period of time. The 8 mm film loop was found to be effective in the review of instruction and for experimentation (Schofield, 1966). The advantages of the film loop, locally produced are suggested by Brown (1964), Finn and Rosengreen (1962), and Miller (1967), who cite low cost, substitution for field trips, and convenience of use.

The need for the production of 8 mm environmental education films is highlighted by a review of the catalogs of audio-visual materials. Although there are over 3,000 current titles, only two references were located which were concerned with the use of motion pictures in specific topics of environmental education.

With the exception of the report of Louis Forsdale, "Eight Millimeter Film in Education, Its Emerging Role," which substantiates the belief of the investigators in the importance of this media, a review of Research in Education produced no additional information of specific pertinence to the study.

In the absence of research or literature thus far reviewed by the investigators which identifies the availability of 8 mm loops in the area of environmental education and the suggested validity of this method as an instructional technique, it would appear that research on the development and production of such films is well warranted.

C. SPECIFIC OBJECTIVES OF THE STUDY

1. To contribute to the use, improvement and preservation of environmental resources by identifying a series of topics relevant to environmental education.

2. To produce instructional materials on environmental issues and problems by producing a limited number of 8 mm single concept film loops on these topics.

3. To provide guidance to groups and individuals studying environmental education by developing instructional materials to accompany the film loops.

4. To produce an evaluation of the completed films and instructional materials by submitting them to a committee of audio-visual, environmental, and educational consultants.

5. To facilitate further research in the production and use of 8 mm film loops by providing information relevant to development procedures, costs, etc.

6. To produce recommendations for the duplication and dissemination of 8 mm film loops and instructional materials throughout the state.

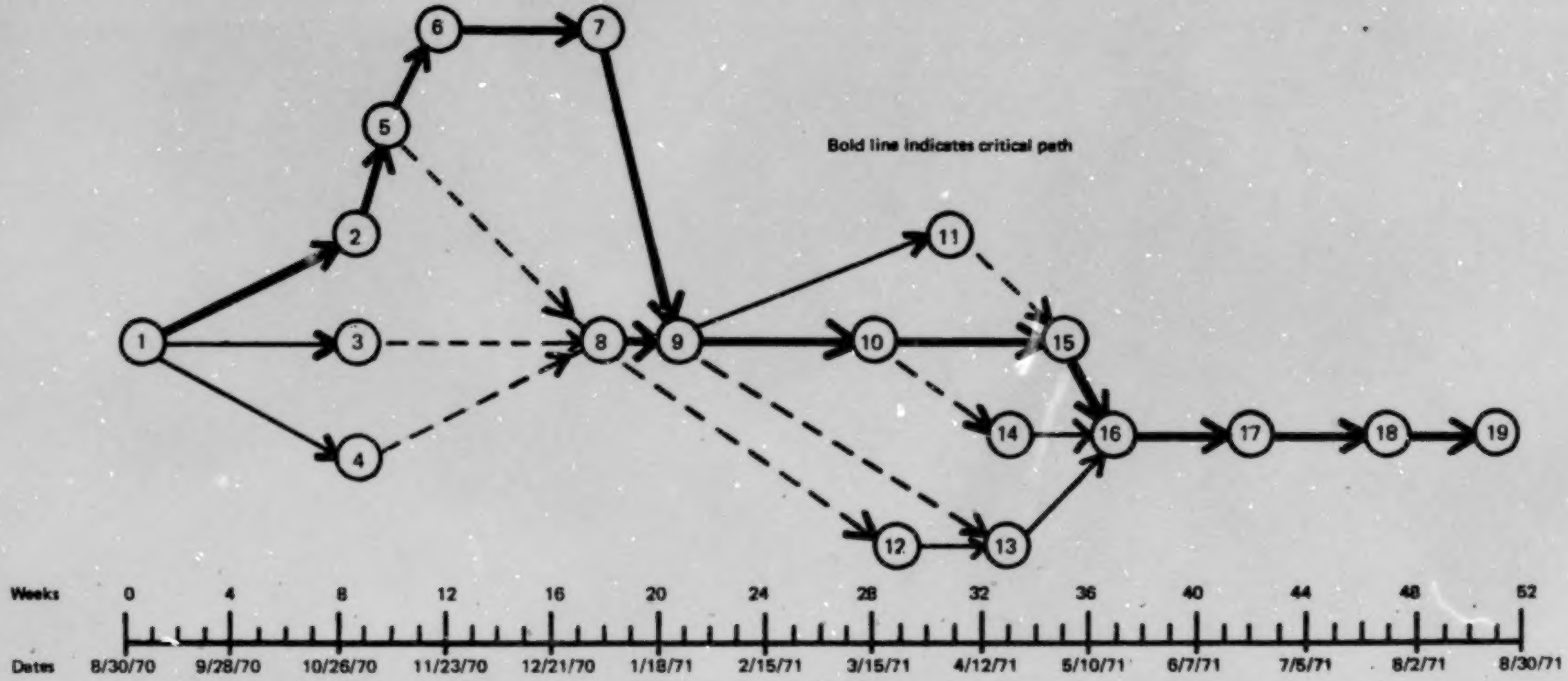
D. WORK BREAKDOWN STRUCTURE

In accomplishing the objective of this project, the following missions, tasks, and sub-tasks will be completed:

Missions	Tasks	Sub-Tasks
1.00 Review and Analyze the Literature.	1.10 Review and analyze literature on environmental education.	
	1.20 Review and analyze literature on development and utilization of film loops for instruction.	1.21 Review and analyze literature on use of films in instruction. 1.22 Review and analyze literature on development and utilization of 8 mm film loops
2.00 Produce Instructional Materials	2.10 Produce scripts to accompany film loops.	2.11 Identify content areas to be included in the scripts. 2.12 Synthesize content in the selected areas. 2.13 Write scripts. 2.14 Revise scripts.
	2.20 Produce film loops.	2.21 Prepare filming schedule. 2.22 Produce 16 mm films 2.23 Edit 16 mm films. 2.24 Reproduce 16 mm films on 8 mm. 2.25 Add narration and background sound to 8 mm.
	2.30 Develop guides for use of the film loops.	

(continued on next page)

Missions	Tasks	Sub-Tasks
3.00 Evaluate and disseminate the results of the project.	3.10 Evaluate project efforts.	3.11 Plan field test. 3.12 Develop evaluation plan and instruments. 3.13 Conduct field test and administer evaluation instrument. 3.14 Analyze and synthesize evaluation data.
	3.20 Write project final report.	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12/21/70
1/18/71
2/15/71
3/15/71
4/12/71
5/10/71
6/7/71
7/5/71
8/2/71
8/30/71

Bold line indicates critical path

Work Flow Event Numbers and Activity Descriptions

EVENTS NOS.	ACTIVITY DESCRIPTION	EVENTS NOS.	ACTIVITY DESCRIPTION
1-2	Review and analyze literature on environmental education	9-10	Edit 16 mm films
1-3	Review and analyze literature on use of films in instruction	10-15	Reproduce 16 mm films on 8 mm film
1-4	Review and analyze literature on 8 mm film loops	15-16	Make cassette tapes
2-5	Identify content areas to be in scripts	14-16	Develop guides for use of film loops
5-6	Synthesize content in the selected areas	12-13	Plan field test
6-7	Write scripts	13-16	Develop evaluation plans and instruments
7-9	Revise scripts	16-17	Conduct field test and administer evaluation instruments
8-9	Prepare film schedule	17-18	Analyze and synthesize evaluation data
9-11	Produce 16 mm films	18-19	Write final report

PROJECT WORK FLOW

F. BUDGET

Line Item No.	Item Description	Mission 1	Mission 2	Mission 3	Project Subtotals
1	A. Direct Costs 1. Personnel a. Project Director-P. Beckley 1/2 time for 12 mos. @ 7200/yr				$ 3,600
2	b. Investigators (2) 1/4 time for 12 mos. @ 7200/yr	600	1,125	1,875	3,600
3	c. Writers (2) 1/4 time for 4 mos. @ 7200/yr		1,200		1,200
4	d. Consultants in audio-visual techniques (1) 4 days @ 75/day	75	225		300
5	e. Consultants in environmental education (4) 2 days @ 75/day	75	75		150
6	f. Typist-clerical assistant (1) full-time 12 mos. @ 5400/yr	900	2,250	2,250	5,400
7	g. Professional photographer (1) 4 mos. @ 500/mo.		2,000		2,000
8	h. Graduate research student assistant (1) 7 mos. @ 400/mo.	800	2,000		2,800
9	PERSONNEL SUBTOTAL	2,450	8,875	4,125	19,050
10	2. Employee Benefits (10% of all salaries)	245	887.50	412.50	1,905
11	BENEFITS SUBTOTAL	245	887.50	412.50	1,905

Line Item No.	Item Description		Mission		Project Subtotals
		1	2	3	
	3. Travel				
	a. Transportation				
12	(1) Consultant travel, 6 trips @ 50/trip	100	200		300
13	(2) Regional travel to identify filming sites, 4 days @ 50/day		200		200
	b. Per diem				
14	(1) 6 consultant days @ 25/day	50	100		150
15	(2) 2 people, 4 days each, @ 25/day	—	200		200
16	TRAVEL SUBTOTAL	150	700		850
	4. Supplies and Materials				
17	a. 16 mm films, 20 100 ft. reels @ 9/100 ft.		180		180
18	b. Replacement bulbs, 5 @ 5/each		25		25
19	c. General office supplies	100	100	200	400
20	d. Reference texts, Microfiche purchase, 10 @ 5/microfiche	50	—	—	50
21	SUPPLIES AND MATERIALS SUBTOTAL	150	305	200	655
	5. Services				
22	a. Photo services (reduction, duplication, loading, and treating)		3000		3000
23	b. Xeroxing services, 500 copies @ 10¢/copy	50	—		50
24	SERVICES SUBTOTAL	50	3000		3050
25	6. Final Report Production (Standard School Central Duplicating Costs, 30 copies @ 3/copy)			90	90

Line Item No.	Item Description	Mission			Project Subtotals
		1	2	3	
26	7. Equipment--lighting tripod		24		24
27	EQUIPMENT SUBTOTAL		24		24
28	SUBTOTAL DIRECT COSTS	3,045	13, 26.50	4,827.50	25,459
29	B. Indirect Costs, 8 % of Direct Costs				2,037
30	TOTAL COSTS				$27,496

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Document B

Letter from Mr. Charles Greymont, Director, Division of Research, Planning and Development of the New Hopewell State Department of Education to Mrs. Pat Beckley, dated August 15, 1970.

August 15, 1970

Pat Beckley, Project Director
Armitage City Schools
Armitage, New Hopewell

RE: Title III, ESEA, Project Application: "Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School."

Your project application identified above has been reviewed by a Panel of Experts. Ratings and comments have been composited by the Division of Research, Planning and Development and presented to the Title III State Advisory Council who, in turn, have made their reviews and recommendations.

After careful consideration, the above project has been recommended for approval pending negotiation of program and budgetary elements. You will be contacted in the near future by this office to set up a mutually satisfactory time and place for the negotiation of this project.

Yours very truly,

Charles Greymont

Charles Greymont
Division of Research, Planning
and Development

CAG/sf

cc to: Dr. Stephen Ford, Superintendent
Miss Madeleine Conners, Director,
Project Management Office

Simulation
Phase B

B.20

Document C

Memo from Madeleine Conners, Director, Project Management Office, to Pat Beckley.

To: Mrs. Pat Beckley, Chairman, Environmental Education Committee

From: Miss Madeleine Conners, Director, Project Management Office MC

Subject: Environmental Education Film Loop Project

Date: August 7, 1970

We have received word that the project titled "Development and Production of Single Concept Film Loops for Dissemination of Environmental Education Information to Youth in the Middle School," has been approved for funding. In order to provide assistance to you in starting this project by its start date of September 1, 1970, we will require certain information concerning personnel requirements, facilities needs, etc.

Also, in order to assist you regarding the organization of your project personnel and to provide records for our information, we are asking that you supply us with a management responsibility guide and an outline of your reporting system. These are kept on file to show the history of your project and give guidance to others who will be conducting projects in the future. It will also let us know where you might need help in managing your project.

The following forms are to be completed and returned to my office as soon as possible.

1. Job Description (PMO Form 16). Please submit this job description form for the positions of investigator/writer and writer as named in your project. Such forms are not necessary for other personnel of the project.
2. Equipment and Facilities Needs (PMO Form 23). Please show on this form what facilities and equipment you will need which was not listed in your budget and which will be supplied by the school system. This includes office space (suggest a possible location), desks, filing cabinets, and such other equipment which might be reasonably supplied from school system facilities.
3. Project Organization Chart (PMO Form 15). Diagram here the organization chart for your project.
4. Management Responsibility Guide (PMO Form 7). This is designed to show the functions and tasks of each member of the project (including the project manager). Be sure you read carefully the instructions for completing it which are attached.

5. Major Milestones (PMO Form 4). Indicate the major milestones of the project, showing completion dates, and describing each.

6. Project Reporting System (PMO Form 24). Indicate here what reports will be made regarding the progress of the project, when they will be made, to whom, and their purpose and general content.

I apologize for giving you such a short time to complete these forms but the project start date is fast approaching and we must get things under way. The information on personnel and equipment and facilities needs will be sent to the appropriate offices for their action. The personnel office will advertise within the school system for the requested personnel and refer applicants to you for approval. The Buildings Utilization Department of the Business Office will notify you of your space assignment and the Equipment Section will assign necessary equipment to your project. There is no need to contact them at this time.

Phase B--Preparing the Project

Problem Instructions

Directions: The pages following contain the several forms noted in the letter from Madeleine Conners. Your task now is to complete the forms using the information contained in the several documents in this lesson. You may refer to Phase A as you so desire.

After you have completed the forms, evaluate your answers by doing one of the following:

1. *If you are performing the simulation by yourself, turn to the Phase B Critique and Checklist section of the Simulation Manual, or*
2. *If you are working through the problem as a member of a team, follow your group leader's instructions for evaluating your answers.*

Turn the page and begin to complete the forms.

Position Description

1. Project Title ______________________________
2. Project Manager ______________________________
3. Date Position Begins ______________________________
4. Position Title ______________________________
5. Duties and Responsibilities:

6. Experience and Qualifications Desired:

(PMO Form 16)

Position Description

1. Project Title ______________________

2. Project Manager ______________________

3. Date Position Begins ______________________

4. Position Title ______________________

5. Duties and Responsibilities:

6. Experience and Qualifications Desired:

(PMO Form 16)

Simulation
Phase B

Project Equipment and Facilities Needs

Project Title: ______________________________

Instructions: Specify in detail the requirements which the project has for equipment and facilities. Be sure to include the dates during which these items will be used. In the column headed "Source," suggest a source for the equipment by using one of the following letters:

A--Obtain item locally within school system; it is likely that the school system has such an item on hand.
B--Procure the item by purchasing it.
C--Procure the item by renting it.

Line No.	Item Description	Source	Dates of Use

(PMO Form 23)

Project Organization Chart

Project Title: ______________________________ ______________

Project Manager: ____

Dates of Project: From ________________ To ________________

(PMO Form 15)

Management Responsibility Guide

Event Numbers	Activity Description	Position Titles								

(PMO Form 7) See instructions for responsibility codes. Use additional forms if more space is required.

Management Responsibility Guide

Event Numbers	Activity Description	Position Titles								

(PMO Form 7) See instructions for responsibility codes. Use additional forms if more space is required.

Management Responsibility Guide

Event Numbers	Activity Description	Position Titles								

(PMO Form 7) See instructions for responsibility codes. Use additional forms if more space is required.

Instructions for Completing PMO Form 7

Please refer to and become familiar with these instructions and the MRG code definitions (which are attached) before trying to complete PMO Form 7.

PMO Form 7 is designed to show the relationships between the activities of a project and the positions or organizations which are related to them. First, enter the various activities along the left column along with their numbers, if any. Along the top, place the titles of positions or organizations that may have possible relationships to the project.

In determining relationships, you should base your decisions upon what you think the relationships should be, not what you think they are.

If you think no relationship should exist, leave the space in the intersection between position and activity blank.

If you think the relationship should be an operating responsibility then enter responsibility relationship Code "O" in the space where the activity and the position intersect. If a Code "O" is entered for an activity, also examine each of the other positions that head each column and determine whether or not a relationship should exist between them and the activity. If one should exist, enter the appropriate relationship codes.

Under most circumstances, only one person is assigned general responsibility and only one person is assigned operating responsibility for a particular activity. Under certain circumstances, this may not be true, however. For example, a person with general responsibility for an activity which is carried out in more than one geographic, product, or work area, could delegate responsibility to an individual in each area. Only under such a circumstance could more than one "B" appear for each function.

One person may be assigned both general and operating responsibility codes when that person does not delegate operating responsibility. The implication exists that a person who has been delegated the operating responsibility for an activity will consult with the person assigned general responsibility. However, a person with general responsibility for an activity may want to have more control over that activity; he might therefore also be assigned a code that indicates he "must be consulted," "must be notified," or "must approve."

A person who has specific responsibility for an activity is functionally accountable to the person with operating responsibility for fulfilling a limited portion of that function. It is fundamental that both are in agreement as to the portion of the function that the person with specific responsibility has been delegated and for which he is being held accountable.

It is not necessary that each position or organization which heads each column have a relationship to each activity. However, no more than two relationship codes are to be entered for a position or organization for a given activity. In combining codes, the following combinations are the only relationship code combinations that can be made:

Code G with Code O, S, M, N, or A

Code O with Code G only

Code S with Code G, M, Y, N, or A

Code M with Code G, S, N, or A

Code Y with Code S, N, or M

Code N with Code G, S, M, Y, or A

Code A with Code G, S, M, Y, or N

RESPONSIBILITY RELATIONSHIP CODES

Code	Meaning	Explanation
G	General Responsibility	Individual guides and directs execution of function through the person delegated operating responsibility and has approval authority over function.
O	Operating Responsibility	Individual is directly responsible, at the operating level, for execution of function.
S	Specific Responsibility	Individual is delegated responsibility for execution of specific or limited portion of function.
M	Must Be Consulted	Individual, if decision affects his area, must be called in prior to any decision being made, or approval granted, to confer, render advice, or relate information but does not make decision or grant approval.
Y	May Be Consulted	Individual may be called in to confer, relate information, render advice or make recommendations.
N	Must Be Notified	Individual must be notified of action that has been taken.
A	Must Approve	Individual (other than persons holding general and operating responsibility) must grant approval.

Simulation
Phase B

Major Milestone Summary

Instructions: Provide in the spaced indicated the major milestone events in the project along with the information requested.

Project Title: ______________________ Project Dates: From ______ To ______

Milestone No.	Title and/or Description	Expected Completion Date	Remarks

(PMO Form 4) Use additional blank pages if necessary.

B.32

Project Reporting System

Describe below (briefly) the essential elements and/or information to be in the project progress reporting system. Indicate the title of each report to be made, briefly describe the purpose and content of the report, and name the persons to whom the report will be sent.

Do not take over one page for this information.

STOP!

Check your responses to Phase B at this point by referring to the Critique and Checklist section of the Simulation Manual.

Educational Project Management Instructional System

Simulation Phase C. Controlling the Project

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
Suite 1700, 1700 Market Street
Philadelphia, Pennsylvania 19103

May 1973

718

Phase C--Controlling the Project

Introduction to Phase

A. This booklet contains the following items. Make sure that each item is present before starting to work through the problems.

Page

Introduction to phase. C.1
Overview and objectives. C.2
Abstract and documents list. C.3
Initial instructions C.5
Documents. C.6
Problem instructions C.17
Problem worksheets C.18

B. EQUIPMENT NEEDED

paper
pencils
rulers

C. TIME REQUIRED. It will take approximately 35 minutes to read the documents and problems and about one hour to develop solutions.

Phase C--Controlling the Project

Overview and Objectives

OVERVIEW

The funded project described in the first two phases is now in full operation. In the course of the project, some problems are encountered. Causes of the problems need to be identified and adjustments made in the project. Changes made are to be reported to higher management and a change memorandum for project staff prepared.

OBJECTIVES

The general objective of this phase is to have the student integrate and synthesize his knowledge and skills in project problem analysis and solution. The student should be able to identify project problems and determine their cause. He should also be able to devise a solution to the problem by proposing alternative solutions and select one utilizing criteria he develops. He should then be able to communicate to management any changes that are made to the project.

Phase C--Controlling the Project

Abstract and Documents List

ABSTRACT

Phase C is chiefly concerned with identifying and solving problems which arise in the course of the project which, if not solved satisfactorily, would make the project less than successful or end the project's existence. The project has been progressing essentially according to plan. The literature has been reviewed on the topic of utilizing 8 mm film loops. Several clusters of topics in environmental education have been identified and a professional studio has been engaged to do both filming, editing, and final production.

Upon receiving the bill for the first three of the projected twenty film loops, Pat Beckley discovers that the total cost of the film loops is greater than expected. To further complicate matters, the project typist may well be absent for some time due to illness in her family. The student must select the more important problem, identify its causes, suggest possible alternative solutions, and construct a change memorandum for the one solution selected to deal with the problem.

DOCUMENTS LIST

The following documents are included in this phase in the order indicated:

A. Copy of a memo from the Building Utilization Department allocating office space for the project.

B. Excerpt from the minutes of a meeting of the Environmental Committee in the office of Dr. Warner Adams, on November 2, 1970.

C. Excerpt from the minutes of the Environmental Education Committee in the offices of the project in Wayson Middle School, Dr. Warner Adams attending, on December 21, 1970. The staff of the project were also present.

D. Copy of a letter from Mr. Melvin Hobbs, Manager, Hobbs Film Studios, to Mrs. Pat Beckley, dated January 16, 1971.

E. Partial transcript of a phone conversation between Mrs. Pat Beckley and Mrs. Sharon Weaver, typist for the project, on January 18, 1971.

G. Memo from Mr. Warner Adams to Mrs. Pat Beckley, dated January 20, 1971, Subject: Guides for identifying and solving problems.

H. Memo from Miss Madeleine Conners to Mrs. Pat Beckley, dated January 21, 1971, Subject: Change Memorandum Summary.

Phase C--Controlling the Project

Initial Instructions

Directions: *The following pages contain a series of documents relating to the progress of the project to produce film loops in environmental education. Read these documents carefully since each one contains information which you may need later on. Each document is identified as to its source and nature.*

The last document is a memo from Madeleine Conners requesting your decision and your methods of implementing them. You may refer to these documents or any others from previous phases in working out a solution.

Document A

Copy of a memo allocating office space for the project.

To: Mrs. Pat Beckley, Wayson Middle School

From: Mr. H. Winston, Building Utilization Department, Office of the Assistant Superintendent for Business Affairs HW

Subject: Office space for project "Development and Production of Single Concept Film Loops. . ."

Date: August 28, 1970

This is to notify you that the above named project has been allotted facilities, including office and work space, as follows:

No. of rooms	Total sq. ft.	Location
2	600	Rooms 112 and 113 Wayson Middle School

It is not normally possible to find such space in a school building. However, because Wayson Middle School is quite new and is operating at only about three-fourths of projected enrollment, this seemed the best assignment. It is understood that this space is to be vacated on completion of the project but not later than August 31, 1971.

Document B

Excerpts from the minutes of a meeting of the Environmental Education Committee in the office of Dr. Warner Adams, on November 2, 1970.

Mrs. Pat Beckley reported the following facts to Dr. Adams and the committee concerning the current progress of the project to produce film loops in environmental education.

1. The project began on schedule on September 1, 1970. Two investigators were hired to do the literature search. These people were Miss Sharon Bell, teacher at Wayson Middle School and a member of the Environmental Education Committee who was chiefly concerned with the literature on environmental education; and Mr. Daniel Farber of Lane Middle School, who has done the literature review about the development and utilization of 8 mm film loops. Mr. Farber and Miss Bell will also work as script writers later in the project.

2. Five "cluster areas" have been identified from the literature search as major topic areas for the film loops. Within these five areas, a total of twenty topics have been selected to be made into film loops of two to four minutes. Work is now beginning on the scripts for these loops.

3. Two writers have also been hired to help write scripts. They are Mr. Thomas Shaffer, an English teacher at Lane Middle Schook, and Dr. Robert Archibald, a new instructor in educational technology from Miskatonic University. Dr. Archibald has had some previous experience writing scripts for professionally produced industrial training films. It has not been possible as of yet to hire a graduate student research assistant from the university as had been planned but Dr. Archibald has indicated that one might be available at the beginning of the new semester in mid-January.

Document C

Excerpt from the minutes of a meeting of the Environmental Education Committee in the offices of the project in Wayson Middle School, Dr. Warner Adams attending, on December 21, 1970. The staff of the project were also present.

Scripts for the twenty film loops were nearly finished as of this date and the project was proceeding on schedule. The scripts will be reviewed by the consultants in audio-visual and environmental education. Their comments will be used to revise the scripts. As the scripts are revised they will be sent to a professional photographer for filming. He will then send them to a local studio for editing and reduction to 8 mm loops at the studio's processing facilities. They will be done in "batches" of three or four at a time and ten copies of each film loop cartridge will be made as per the contract.

As presently conceived, each film script consists of the narration to be taped, along with a general description of the scene that accompanies each stage of the narration. The scripts have generally been between three and four minutes long. The photographer will be allowed some latitude in filming. It will take about twice as much film as will be used in the final film loop. It will provide editing instructions to the studio.

Document D

Copy of a letter from Mr. Melvin Hobbs, Hobbs Film Studios, to Mrs. Pat Beckley, dated January 16, 1971.

January 16, 1971

Mrs. Pat Beckley, Project Director
Wayson Middle School
Armitage, New Hopewell 44444

Dear Pat:

We recently forwarded to you under separate cover the first batch of film loop cartridges for your project on environmental education. You will notice that we are sending you one original copy of each of the three films in this batch but only two copies of each film, instead of the ten copies you wanted.

We are doing this because the cost for these films was considerable and we did not want to produce more of them without your knowledge or approval. The total bill for the films we are sending you is $2,000. Since you told me earlier that you had a budget of only $3,000 and wanted to make 20 films and ten copies of each film loop, it would seem that you need to make some adjustment in your budget.

I shall be happy to cooperate in any way I can with whatever solution you devise for this problem. Let me know what you decide.

Sincerely,

Melvin Hobbs

Melvin Hobbs, Manager
Hobbs Film Studios

MH/sf

Document E

Partial transcript of a phone conversation between Mrs. Pat Beckley and Mrs. Sharon Weaver, typist for the project, on January 18, 1971.

Weaver: I'm awfully sorry to have to tell you this but it doesn't look like I'll be in to work today or for a while.

Beckley: What!! What's the matter

Weaver: Well, my daughter is down with the chicken pox and her younger brother is probably going to come down with it pretty soon too. What really worries me is that I've never had them so I'll probably get the chicken pox; I just don't know what to do. I know you need so much help on the project. But I've just got to stay home and take care of these two kids.

Beckley: How long do you think you'll be out?

Weaver: I really have no idea. The kids' chicken pox shouldn't last over one or two weeks. But if I get them, there's no telling how long I'll be out.

Beckley: Yes, of course I understand your position. I hope the kids get better and that you'll be back soon. . . .

Document F

Partial transcript of a phone conversation between Mrs. Pat Beckley and Dr. Warner Adams, on January 19, 1971.

Adams: Pat, how are things coming on the film loop project?

Beckley: At the moment, it seems like I'm going around in circles. Yesterday, the project secretary called in and said she won't be in for at least a week, maybe two, maybe longer. I just don't know how we're going to get these scripts and other items typed up.

Adams: Yes, that certainly sounds like it could hold things up for a while. Anything else bothering you?

Beckley: This letter from Hobbs at the film studio absolutely floored me. I had no idea that this process would cost so much. I haven't checked it out but I think the reason for it is the editing of the movies. It's quite a time-consuming process and the labor costs on it are high.

Adams: That brings up my main worry at the moment. Do we complete this project or simply abandon it or get more funds or what? You've got a contract, of course, and I would very much like to see it finished insofar as possible.

Beckley: As project director, naturally it's my responsibility to come up with a solution. I can tell you a few things, however, which are going to influence my selection of a course of action.

I talked with Chuck Greymont at the State Departmnet of Education earlier today and he told me three things. First, we definitely cannot get more money for the project; we must live within the budget we have now. Second, we must produce the twenty film loops contracted for. However, he is agreeable to letting us do only two copies of each loop, instead of the ten originally planned. If they're good, he wants to use them in other parts of the state. He can probably find money elsewhere to reproduce more copies of them. Third, we cannot get any time extension on the project. It must be done by the originally scheduled dates in our proposal.

I also talked with our budgeting office and we are free to transfer funds within our budget any way we wish.

Adams: Well, I think the situation may rule out the continued use of any professional film services in finishing this thing up.

Beckley: I'll try to think of a solution. Archibald out at the university tells me we can get a graduate student to assist us starting this upcoming semester but heaven only knows what I'll do with him now. This is going to take quite a bit of thought.

Adams: Listen, tell you what. An assistant principal over at Malcolm X High School, who has directed a few projects in this school system, recently wrote up a couple of things that may help you. They're some commandments for problem identification and problem-solving. I liked them and I think they may help you.

Beckley: Fine, anything like that would be appreciated at this point.

Adams: But tell me, which do you think is the most problem right now, the overspending, or the absence of your secretary?

Beckley: I don't know right now; I'll have to think about it. . . .

Adams: Keep me advised of your progress and the decision you make. Good luck.

Document G

Memo from Dr. Warner Adams to Mrs. Pat Beckley, dated January 20, 1972.

To: Mrs. Pat Beckley, Wayson Middle School

From: Dr. Warner Adams, Assistant Superintendent of Curriculum WA

Subject: Guides for identifying and solving problems

Date: January 20, 1971

I am enclosing two items titled "Six Commandments for Problem Identification" and "Seven Commandments for Problem Solving" which were written by the assistant principal at Malcolm X High School. I think they may be helpful to you in your current situation.

I am also asking you to complete a memo from you to me about how you finally identified the major problem and your recommended action for solving it.

I will be most interested in your response.

SIX COMMANDMENTS

FOR

PROBLEM IDENTIFICATION

1. Thou shalt always specify accurately what the problem is. (A problem is a deviation between a "should" and a certain "actual" state of affairs. Try answering questions about what, where, when, how much, etc.)

2. Thou shalt always specify accurately what the problem isn't. (Go through those questions in Commandment 1 again. Find out what is not affected.)

3. Thou shalt develop, contrast, and otherwise make distinctive differences between each is and its corresponding is not. (Maybe in answering "where" you found the deviation is only in one place and is not in other places. Find this kind of contrast in the dimensions of the problem you described above.)

4. Thou shalt use these distinctions to develop possible causes. (Look at each distinction. Try combining some of them. State possible causes very specifically. Remember that just about anything is possible.)

5. Thou shalt derive probable causes by putting possible causes to trial. (Test each possible cause to see where it does not fully and simply explain the problem's is and is not dimensions. Eliminate those that flunk.)

6. Thou shalt select the most probable cause and verify it by further trial. (Once you verify it, you can assure yourself that the most probable cause is the real cause.)

SEVEN COMMANDMENTS
FOR
PROBLEM-SOLVING

1. Thou shalt clearly specify the results to be achieved.
   (A decision is the best choice of a course of action to reach a certain objective. First, you have to specify the objective.)

2. Thou shalt determine all the relevant resources that need to be considered for this decision situation.
   (You need to know what you have to work with with respect to money, people, materials, etc.)

3. Thou shalt separate the objectives into the needs and the likes.
   (The needs are the objectives that are so critical to the decision situation that any alternative proposed must satisfy them. The likes are those which may be weighted for their relative importance to the decision situation and which alternatives may satisfy to varying degrees.)

4. Thou shalt devise alternatives that might work.
   (Think up several of them, covering a range of actions which ought to be considered.)

5. Thou shalt test the alternatives for the degree to which they satisfy the objectives.
   (Test each alternative on a "go" or "no-go" basis and eliminate those which do not satisfy needs objectives. For remaining alternatives, weight each for its relative satisfaction of likes objectives.

6. Thou shalt consider the adverse consequences.
   (For the alternatives that best satisfy like objectives, consider what adverse consequences could occur from instituting each. Consider what could keep each from achieving the set objectives.)

7. Thou shalt select the alternative that is best.
   (Select the alternative that satisfies all the need objectives, and which provides the best balance between satisfying the like objectives and minimizing the adverse consequences. If none of the alternatives fit, go back and devise some new ones.)

Document H

Memorandum from Miss Madeleine Conners to Mrs. Pat Beckley, dated January 21, 1971.

To: Mrs. Pat Beckley, Chairman, Environmental Education Committee

From: Miss Madeleine Conners, Director, Project Management Office mc

Subject: Change Memorandum Summary

Date: January 21, 1971

Dr. Adams has informed me that it is necessary for you to make some changes regarding the course of your project to produce film loops in environmental education. I would like to have for our files a summary of your change memorandum outlining exactly what you intend to do. I have enclosed a standard form for this purpose. Please put your summary on this form as indicated.

Phase C--Controlling the Project

Problem Instructions

Directions: The following pages contain the memo that is to be filled out and returned to Warner Adams concerning your problem analysis and solution and the form for the change memorandum summary mentioned in the memo from Madeleine Conners. Your task now is to complete these items using the information contained in the documents in this phase. You may also find it valuable to refer to documents and information presented in previous phases.

After completing your responses, evaluate your answers by doing one of the following:

1. If you are performing the simulation by yourself, turn to the Phase C Critique and Checklist section of the Simulation Manual.

2. If you are working through the simulation as a member of a team, follow your group leader's instructions for evaluating your answers.

Turn the page and begin working.

Simulation
Phase C

C.18

To: Dr. Warner Adams, Assistant Superintendent of Curriculum

From: Mrs. Pat Beckley, Wayson Middle School

Subject: Problem Summary Statement

Date: January 23, 1971

A. Problem statement (Describe the exact nature of the problem, the resources available to deal with it, probable causes, etc.).

B. Objective (State the objective you were striving for in attempting to solve the problem. Distinguish between need and like objectives.).

C. Alternatives (Describe the alternatives you devised to solve the problem. Briefly give some of the advantages and disadvantages of each and the reason, if any, for rejecting them.).

D. Action (State specifically what course of action you finally chose and why you chose it. Be sure to indicate any potential adverse consequences that might arise and ways of dealing with them.).

Phase C--Controlling the Project

Change Memorandum Summary

Project Title: ____________________

Project Director: ____________________

Project Duration: From __________ To __________

Date: ____________________

A. Briefly describe the problem, its cause, the management decision and the judgement used to make the decision.

B. What changes were made to the project objectives, the work activity and performance standards?

C. What changes were made to work sequence?

D. What changes were made to the staffing, personnel and the duties and responsibilities of the staff?

E. What changes were made in the schedule?

F. What additions, deletions, or changes were made in equipment and facilities?

G. What budgeting changes were made?

H. Describe the potential problems that may occur and any precautions that have been taken.

I. To whom was the change memorandum distributed?

STOP!

Check your responses to Phase C at this point by referring to the Critique and Checklist section of the Simulation Manual.

Educational Project Management Instructional System

Simulation Phase D. Terminating the Project

Project Management Component
Administering for Change Program
Research for Better Schools, Inc.
Suite 1700, 1700 Market Street
Philadelphia, Pennsylvania 19103

May 1973

741

Phase D--Terminating the Project

Introduction to Phase

A. This booklet contains the following items. Make sure that each item is present before starting to work through the phase.

Page

Introduction to phase D.1
Overview and objectives D.2
Abstract and documents list D.3
Initial instructions. D.5
Documents D.6
Problem instructions. D.17
Problem worksheets. D.18

B. EQUIPMENT NEEDED

paper
pencils
rulers
previous phase booklets

C. TIME REQUIRED. It will take approximately 20 minutes to read the documents and problems and about one hour to develop solutions.

Phase D--Terminating the Project

Overview and Objectives

OVERVIEW

This phase is concerned with activities associated with the end of a project. A situation is presented in which the student must make various decisions concerning the content of a termination plan, a final report, a project history, and related termination or transition decisions.

OBJECTIVES

The general objective is to have the student to put together in an integrated fashion some activities involved with the termination of a project. He should see the interrelationships of the information contained in such documents as the final report and the project history and their relationship, in turn, to the original proposal and the information gathered during the progress of the project. He should also be cognizant of the decisions that need to be made with regard to the disposition of personnel, equipment, facilities and other project materials and products.

Phase D--Terminating the Project

Abstract and Documents List

ABSTRACT

After solving the problem of producing the film loops with the remaining limited funds, the balance of the film loops were made and tested in several schools. The cassette tape narrations and accompanying user guides were also completed and tested at the same time. The test presentations produced favorable reactions from both students and teachers. However, Madeleine Conners, on a visit to the project offices, notices that no project termination plan has been devised and requests Pat Beckley to draw one up. You are to outline such a plan along with a project history.

DOCUMENTS LIST

The following documents are included in this phase:

A. Excerpt of minutes from a meeting of the Environmental Education Committee held on May 10, 1971, at Wayson Middle School. Staff members from the project were also present.

B. Instructions and evaluation forms from the materials sent to schools invited to try out the completed film loops. Film loops, cassettes, and supplementary written materials accompanied these documents. The guidebooks have been omitted from the document.

C. Newspaper article from the Armitage Daily Sentinel, dated May 24, 1971.

D. Letter from Mrs. Hosea Turner, Graduate Assistant, to Mrs. Pat Beckley, dated June 1, 1971.

E. Letter from Mrs. Angela Spiess Audio-Visual Supervisor, to Mrs. Pat Beckley, dated June 1, 1971.

F. Excerpt from a transcript of a phone conversation between Miss Madeleine Conners and Mrs. Pat Beckley, dated June 4, 1971.

G. Memo from Miss Madeleine Conners to Mrs. Pat Beckley, dated June 7, 1971, concerning the project termination plan and project history.

Phase D--Terminating the Project

Initial Instructions

Directions: On the following pages are a series of documents describing the further progress of the film loop project. Read these documents carefully since they contain information which you may need later. Each document is identified as to its source and nature.

The last document is a memo from Madeleine Conners asking for a description of the project termination plan and the project history. You are to complete these forms and also write two brief memos concerning the disposition of the film loops and the re-employment of a staff member.

Turn the page and begin reading.

Document A

Excerpt of minutes from a meeting of the Environmental Education Committee held on May 10, 1971 at Wayson Middle School. Members of the staff from the project were also present.

. . .The progress of the project was reviewed briefly by the project director, Pat Beckley. Since the problem with the excessive charges for the original film loops, an attempt had been made to make the films directly on 8 mm film without editing. A graduate student assistant was hired who had experience in making films and, after very careful planning by the writers on the project staff, scripts were written which were very exact with respect to timings and narration. This greatly simplified the eventual filming of scenes for the loops. The completed 8 mm films were sent to a commercial processor for duplication and then inserted into cartridges.

The guides for using the loops had been prepared and were now being duplicated. The cassette tape narrations to accompany the film loops had been completed by the project staff and were being duplicated by the school system's central audio-visual service department.

A number of schools in the local area and around the state had been contacted with regard to cooperating in an initial tryout of the films in order to evaluate them. . . .

Document B

Instructions and evaluation forms from the materials sent to schools invited to try out the completed film loops. Film loops, cassettes, and supplementary written materials accompanied these documents.

Introduction

You have been invited to participate in evaluating a different method of providing environmental education information to youth in the middle schools.

This method consists of viewing a single concept motion picture film loop concerning a specific topic which is a member of a cluster of topics and listening to a cassette tape narration describing nature of the environmental problem and its potential solution.

This method is not considered as a replacement for current films and materials in environmental education but is an approach to provide individualized instruction, with low cost projection and sound equipment.

An information sheet describing how to use the cartridge projector and cassette recorder, and a written guidebook on the topic is included.*

Please view the film and complete the attached evaluation form.

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*Note: Guidebook omitted from Document B

Document B (continued)

INSTRUCTION FOR VIEWING

SINGLE CONCEPT 8 MILLIMETER FILM LOOPS

WITH CASSETTE SOUND RECORDING

Introduction

The projector is a technicolor super 8 millimeter projector. The "ON" and "OFF" switch is located at the top right of the projector. Focusing may be done by turning the lens to left or right. The cassette recorder will have a play, stop, and rewind button. Since these tapes have been clipped, there is no hazard of recording or erasing the tape.

Instructions

Step 1. Insert the cartridge in the super 8 movie projector, flat side forward. It can only be inserted one way.

Step 2. Insert the cassette tape in the recorder provided with tape toward you.

Step 3. Start the projector by turning right hand knob on top of projector to "ON"--depress "PLAY" on cassette recorder to start the tape. There will be a delay as the sound is timed to begin after the film identification is complete.

Step 4. When film has been shown and tape is completed, turn off projector and press "STOP" button on recorder.

Step 5. If you wish to see the film again, rewind the tape by pressing "REWIND" button. Stop the projector.

Step 6. Repeat steps 3 and 4. If the film and tape are not exactly synchronized, the cartridge film may be stopped by pushing the "STILL PICTURE" button on the top of the projector.

Step 7. Complete the evaluation form and turn it in.

Document B (continued)

FILM EVALUATION FORM

Film Title: ____

Running Time: ________________ Date of Evaluation: ____________

Name and Title of Evaluator: ________________________________

____

Part I: Content--The film should illustrate information in the following areas: (Check the most appropriate description of each item below: A--Adequate, I--Inadequate).

A	I	
____	____	1. The nature of the environmental problem.
____	____	2. Setting of the problem.
____	____	3. Personal rewards in maintaining this part of the environment.
____	____	4. Personal responsibilities in correcting the problem.
____	____	5. Methods of maintaining a good environment.

Part II: Style and Format--Check the most appropriate description.

A	I	
____	____	1. Length of film.
____	____	2. Implications for motivating students.
____	____	3. Basic information for students.
____	____	4. Structure of film (organization, editing, continuity).
____	____	5. Picture quality (clarity, framing, color, etc.).
____	____	6. Sound quality (audibility, voice, music, effects).

Document B (continued)

Part III: Recommendations

A. Recommended age - grade level: Check all spaces below that are appropriate. If you check "special," specify the nature of the group under "B".

___Primary (1-3)

___Intermediate (4-6)

___Middle School (5-9)

___Jr. High School (7-9)

___Senior High (9-12)

___Disadvantaged students

___Special

___Adult

___College

B. Comments or general impression (note here special points you wish to mention and a brief statement of how the film affects you).

C. Please indicate your estimate of this film (Check one).

__________Highly Recommended

__________Recommended

__________Useful

__________Poor

D. If recommended, what applications are indicated?

E. If not recommended, what changes are suggested?

Document B (continued)

STUDENT FILM EVALUATION FORM

Film Title ____

Evaluated by ______________________________ Date ______________

Age __________ Year in school ____________ Class ______________

You have just looked at a short film on environmental problems. Please rate it according to the statements listed below:

	YES	NO	UNDECIDED
1. Was the relation of the topic to human life made clear?	___	___	___
2. Were methods of solving this problem discussed clearly?	___	___	___
3. Did you perceive something new about your environment because of this film?			
4. Did you want to do something about the problem that was discussed in the film?	___	___	___
5. Did you see any relation of this topic to other environmental topics?	___	___	___
6. Was this film long enough to show you what you wanted to know about this topic?	___	___	___

7. This film as a method for individualizing instruction on environmental education was (check the appropriate rating):

_________Excellent ________Good ________Fair ________Poor

8. This film as a method of learning about the environment was (check the appropriate rating):

_________Excellent ________Good ________Fair ________Poor

9. Mark the spaces listed if you have learned about environmental problems by any of the following methods:

_____Written materials _____Slides _____Film Strips _____Records

10. In the space below, please describe your feelings about the use of this film as a method of environmental education.

Document C

Newspaper article from the Armitage Daily Sentinel, dated May 24, 1971.

Local students are learning about ways to preserve and restore the environment in a new way and students around the state may soon be doing the same as a result of a project conducted by Armitage teachers. A special feature of the project is its use of "film loops" accompanied by a taped lecture.

Mrs. Pat Beckley, chairman of the project and teacher in Wayson Middle School, explained the purpose of the project: "When we tried to implement a course of study in environmental education, we found that there just weren't any short films we could use, or that the students could use by themselves in individualized instruction." At Wayson Middle School, students are often given projects to work on by themselves in the school's Instructional Materials Center, a sort of glorified library featuring films, slides, and records in addition to the usual books.

Beckley and the project staff tried to fill this need by producing a series of "film loops," short films that run continuously in a cartridge, like an endless tape recording, on various topics dealt with in the environmental education curriculum.

Despite some initial problems, they have now produced twenty film loops, each with its own narration on a cassette tape, and accompanied by a guide book. Beckley feels that this technique will motivate students to find out more about the subject, but cautions that the loops are designed to supplement, not replace, traditional instruction.

The system is currently being tried out in Armitage schools and in a few others around the state. Initial results from an evaluation of the product indicate that the project is a success. Teachers and students have received the films well.

If the project continues successfully, there is a possibility that the loops, tapes, and guidebooks will be reproduced and distributed on a statewide basis.

Document D

Letter from Mrs. Hosea Turner, graduate assistant on the film loop project, to Mrs. Pat Beckley, dated January 1, 1971.

June 1, 1971

Dear Pat,

I've greatly enjoyed working on this project and making the films for the film loops on environmental education. I am concerned, however, about a job for the coming school year and wanted to write you about the possibility of continuing my work on the project.

What I wanted to know was whether or not this project will be continuing with the school year beginning in September, 1971. If it is to be continued, would there be a possibility of being re-employed at that time? As you know, my current employment on the project began on February 1, and will end on August 31, 1971. I am concerned about finding a new job at that time or remaining with the project.

If it is possible that the project will continue, I would like to be considered for employment. If not, would you please write a recommendation for my for my placement folder at the Educational Placement Office at Miskatonic University.

Thank you for your attention to this matter.

Sincerely,

Hosea Turner

Hosea Turner

Document E

Memo from Mrs. Angela Speiss, Supervisor of Audio-Visual Services, for the Armitage City School System, to Mrs. Pat Beckley, dated June 1, 1971

To: Mrs. Pat Beckley, Wayson Middle School

From: Mrs.Angela Spiess, Supervisor, Audio-Visual Services

Subject: Film Loops and Project Equipment

Date: June 1, 1971

I have watched the progress of your project to produce film loops in environmental education with some interest. It seems to me to be quite a useful and successful effort. While I have seen only a few of the completed loops, I certainly believe we would like to acquire several sets of the loops for use throughout our school system.

I would like to know what disposition will be made of the sets of film loops and users' guides which you currently have in your possession. If at all possible, I would like to acquire these for use in our shcools. Please let me know what you plan to do in this regard.

Our records in this office also show that your project has been loaned one 8 mm camera, two film loop projectors, and two cassette tape recorders for use on the project. It is my understanding that these are to be returned at the completion of the project on August 31, 1971. If I am in error in this, please let me know immediately since we have plans to assign these items to other uses when you release them.

Document F

Excerpt from a transcript of a phone conversation between Miss Madeleine Conners to Mrs. Pat Beckley, dated June 5, 1971.

Conners: . . .Good, I'm glad the project is going so well. I've never been to your project offices and, if it's not too much inconvenience, I'd like to pay you a visit this afternoon to see some of your work for myself. I always like to make a field visit to all the projects in our school system and I'm afraid I've neglected yours because of our workload down here. Is this okay with you?

Beckley: Uh. . .well. . .yes, yes, fine. We'd be glad to have you visit. Perhaps we could show you some of our work, a few film loops and such.

Conners: Good, I'll see you in about three hours, say at 1 p.m.

Document G

Memo from Miss Madeleine Conners to Mrs. Pat Beckley, dated June 7, 1971.

To: Mrs. Pat Beckley, Wayson Middle School

From: Miss Madeleine Conners, Project Management Office

Subject: Project Termination Plan and Project History mc

Date: June 7, 1971

On my field visit to your project offices in Wayson Middle School yesterday, I was very impressed with the fine work you and your project staff have been doing. Certainly the evaluation forms that have been returned from the field tests of the film loops have been very favorable. You seem to have solved the budget problem you had earlier quite successfully.

However, I did find one major area which is going to require your immediate attention. You do not at present have a termination plan drawn up for the project. Since it will be ending shortly, you will need to think about such things as disposition of personnel, turnover of facilities and similar decisions. Since your project is a relatively small one, I am enclosing PMO Form 67--Project Termination Plan. I would appreciate your outlining your termination plans on this form so we can also start procedures to turn over facilities and equipment.

I would also like to have you complete a Project History and Review (PMO Form 68) with your recommendations for future project managers. Complete this just before the end of August.

Please return these to me when they are completed.

Phase D--Terminating the Project

Problem Instructions

Directions: The pages following contain the forms noted in Madeleine Conners' memo and two blank memos from Pat Beckley to Hosea Turner and Angela Speiss. Complete the Project Termination Plan first and then the two memos; finish the Project History and Review form last. You will probably find it necessary to use information contained in the documents in this and preceding phases.

After completing your responses, evaluate your answers by doing one of the following:

1. *If you are performing the simulation by yourself, turn to the Phase D Critique and Checklist section of the Simulation Manual.*
2. *If you are working through the simulation as a member of a team, follow your group leader's instructions for evaluating your answers.*

Turn the page and begin to complete the forms.

Phase D--Terminating the Project

Project Termination Plan

Title of Project: ____

Project Director: ____

Project Start Date: ____ ______ Project Termination Date: __________

Directions: Indicate briefly the intended disposition of items or persons in each of the categories listed below:

Equipment and facilities (indicate item and intended disposition):

Personnel (include statement as to probable employment of personnel after completion date):

Products of project (state kind, number, and disposition):

Final Report (indicate topics to be included in the final report):

(PMD Form 67)

To: Mrs. Hosea Turner

From: Mrs. Pat Beckley

Subject: Continuation of Employment

Date: June 10, 1971

To: Mrs. Angela Spiess, Supervisor of Audio-Visual Services

From: Mrs.Pat Beckley, Wayson Middle School

Subject: Planned disposition of environmental education film loops

Date: June 10, 1971

Project History and Review

Title of Project: ______________________________

Project Director: ______________________________

Project Start Date: __________ Project Termination Date: __________

Directions: The purpose of this form is to provide the benefit of your experience in managing this project to future project managers by distilling the problems, solutions, and recommendations you dealt with. Indicate below the major situations you encountered in the planning, preparing, controlling, and terminating of the project; how you think such situations could be handled by future managers; the nature of any solutions you devised and how these might have been improved upon with your "after-the-project" hindsight; list any other recommendations and advice you feel that might contribute to good management of projects in Armitage schools.

It might be a good idea to sit down with your staff and have an open and frank discussion with them shortly before the project ends to determine their views and secure their comments on this matter.

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(PMO Form 68)

STOP!!

Check your responses to Phase D at this point by referring to the Critique and Checklist section of the Simulation Manual.